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This aviation occupations guide is designed for use as a unit as well as in conjunction with an aviation careers package of material that contains a film strip and recording. Chapter One contains the script of the film strip, Aviation--Where Career Opportunities are Bright, and includes all photographs used in the film strip plus numerous amplifying statements. Chapters Two through Nine present information on occupational clusters within aviation: Aircraft Manufacturing Occupations, Career Pilots and Flight Engineers, Aviation Mechanics (Including Repairmen), Airline Careers, Airline Stewardesses or Stewards, Aviation Careers in Government, Airport Careers, and Aviation Education and Other Aviation Related Careers. Each chapter includes general information about an occupational cluster, specific jobs within that cluster, description of the nature of work, working conditions, wages and benefits, and identifies where the jobs are as well as the schools or sources of training. (CH)

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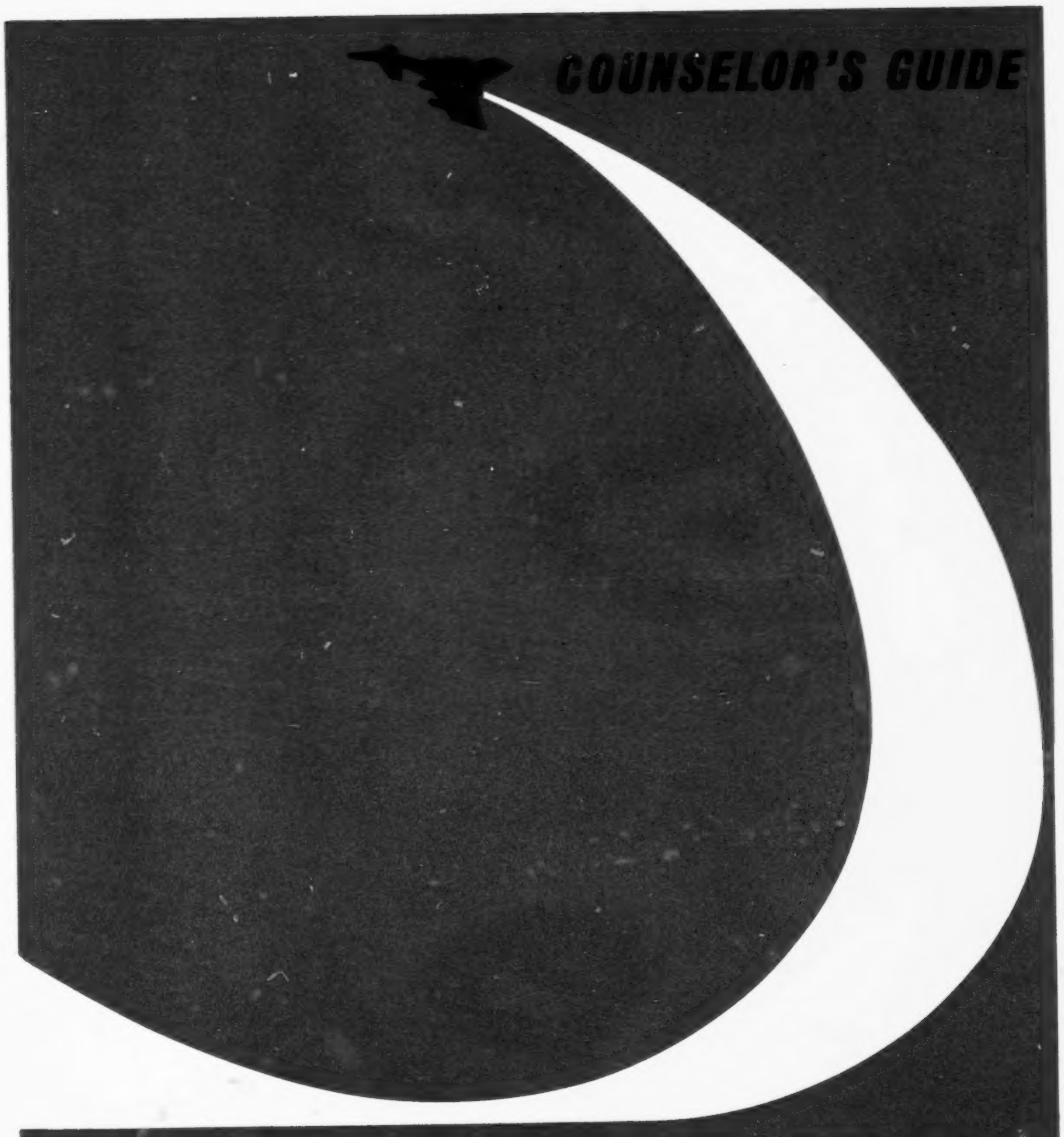

COUNSELOR'S GUIDE

AVIATION

WHERE CAREER OPPORTUNITIES ARE BRIGHT

VT006218

AVIATION—WHERE CAREER OPPORTUNITIES ARE BRIGHT, COUNSELOR'S GUIDE

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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By

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and

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National Aerospace Education Council

First Edition 1968

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Aviation—Where Career Opportunities are Bright, Counselor's Guide

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The contributions of these individuals and organizations to aviation education are gratefully acknowledged.

W. Z. and J. N. M.

FOREWORD

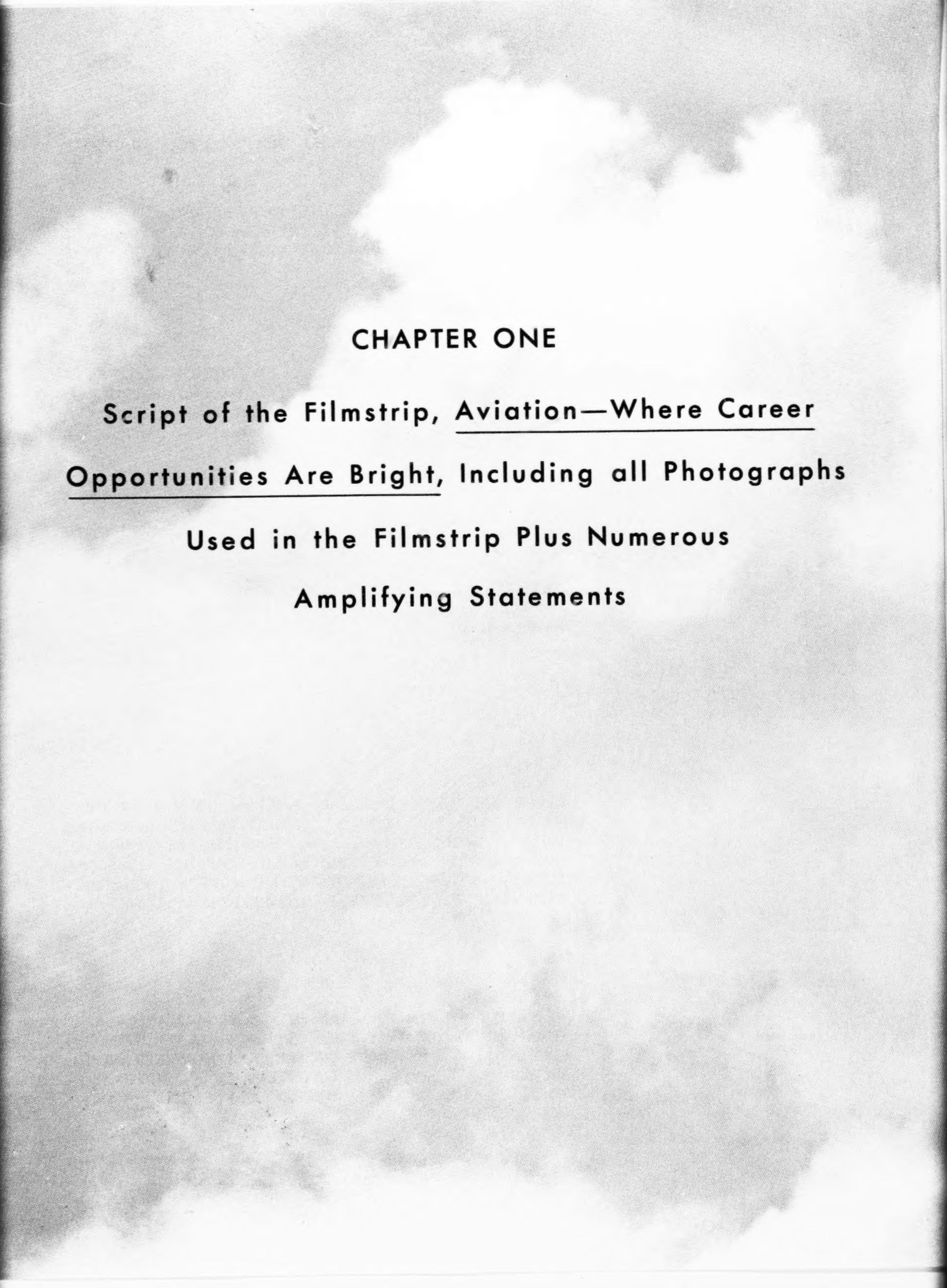
Aviation has penetrated into many areas of the world's businesses, industries, professions, and services. As you guide students in their investigations of aviation careers, you (and the students) are certain to find opportunities in addition to those listed in this GUIDE. The occupational uses of aviation are limited only by one's imagination. The one certain forecast in the vast field of aviation careers is change, as we are a nation geared to change. Aviation science and technology promote change, but the variety of aviation careers provides career mobility which helps an individual to adjust rapidly to change without departing from the overall field of aviation. This tremendous variety also allows the maximum opportunity for the selection of a career that is personally stimulating, challenging, and rewarding (psychologically as well as financially).

Practically all of the employers in the aviation industry are equal opportunity employers: all qualified applicants receive consideration for employment without regard to race, religion, color, national origin, or sex.

If this GUIDE assists an individual to obtain facts which permit him to arrive at a sound and personal career-choice decision (either to enter the field of aviation or not), then the chief objective of this publication will have been accomplished.

> "He ne'er is crowned
> With immortality—who fears to follow
> Where airy voices lead."
> —Keats

Walter Zaharevitz and Jane N. Marshall



CHAPTER ONE

Script of the Filmstrip, *Aviation—Where Career Opportunities Are Bright,* Including all Photographs Used in the Filmstrip Plus Numerous Amplifying Statements

1

1. Dennis:

HI, STEVE! YOU LOOK WORRIED. WHAT'S ON YOUR MIND?

Steve:

I TOLD MY DAD LAST NIGHT THAT WE'RE HAVING A CAREER DAY IN SCHOOL TODAY, AND HE REALLY BORE DOWN ON ME FOR NOT KNOWING WHAT I'M GOING TO DO AFTER I FINISH HIGH SCHOOL!

CAREER DAY
...ATION

2

2. Dennis:

THIS COULD BE YOUR LUCKY DAY. WHY DON'T YOU COME WITH US AND HEAR OUR COMMITTEE'S REPORT ON CAREERS IN AVIATION? GOLLY, STEVE, AVIATION'S A FAST GROWING FIELD WITH A BIG FUTURE. THERE'S BOUND TO BE SOMETHING IN IT FOR YOU WHETHER YOU GO TO COLLEGE OR NOT.

Steve:

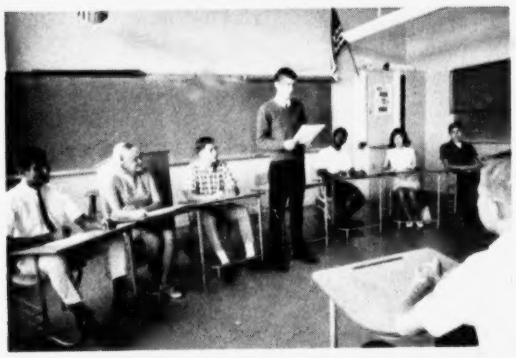
O.K., I CAN'T LOSE. LET'S GO.

AVIATION
...WHERE
JOB OPPORTUNITIES
ARE BRIGHT-

3

3. Dennis:

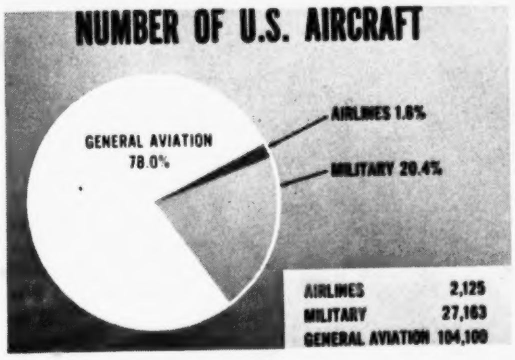
HERE WE ARE, STEVE! NOTICE OUR SIGN? OUR COMMITTEE DREAMED UP THAT TITLE BECAUSE WE BELIEVE AVIATION OFFERS SOME OF THE BEST CAREER OPPORTUNITIES FOR THE FUTURE.



4

4. Walter:

HELLO, AND WELCOME TO OUR PROGRAM. I'M WALTER JONES, CHAIRMAN OF THE CAREER DAY COMMITTEE ON JOB OPPORTUNITIES IN AVIATION, AND THESE PEOPLE WITH ME ARE MEMBERS OF OUR COMMITTEE. YOU'LL BE HEARING FROM THEM AND SEEING THEM IN SOME OF THE PICTURES WE ARE SHOWING YOU TODAY – PICTURES WE TOOK TO ILLUSTRATE CAREERS IN AVIATION.



5

5. Walter:

WE WERE SURPRISED TO LEARN THAT MOST AIRPLANES FLYING TODAY ARE GENERAL AVIATION AIRCRAFT – A TERM THAT INCLUDES ALL PLANES EXCEPT THE SCHEDULED AIRLINES AND THE MILITARY. WE FOUND JOB OPPORTUNITIES IN ALL THREE OF THESE AREAS AS WELL AS IN AIRCRAFT MANUFACTURING AND IN GOVERNMENT.

6. Walter:

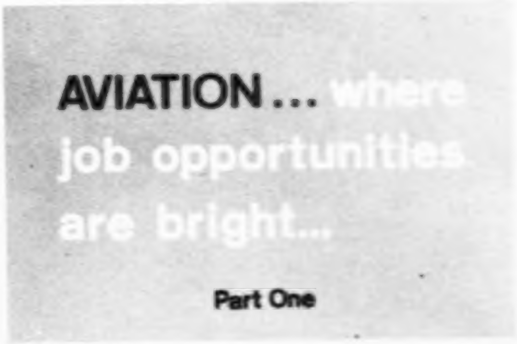
SO COME ALONG WITH US WHILE WE VISIT THE AIRCRAFT PLANT, THE AIRPORT, AND OTHER PLACES IN THE WORLD OF AVIATION WHERE MOST COMPANIES ARE EQUAL OPPORTUNITY EMPLOYERS AND WHERE JOB OPPORTUNITIES ARE BRIGHT.

6

7.

AVIATION . . . WHERE CAREER OPPORTUNITIES ARE BRIGHT

PART ONE



AVIATION ... where job opportunities are bright...

Part One

7

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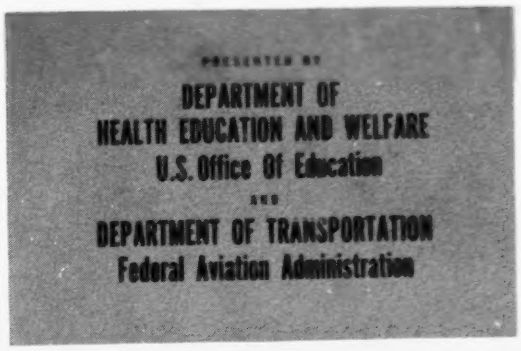

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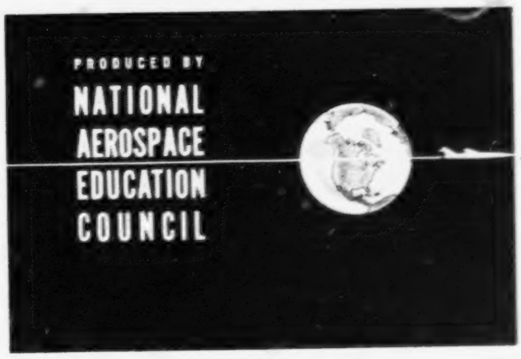

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COUNCIL

9

10. Walter:

MR. MARTIN, OUR GUIDE FOR THE TOUR OF THE AIRCRAFT PLANT, WELCOMED US AND ARRANGED FOR OUR VISITORS' BADGES.

Manufacturers of airplanes, helicopters, aircraft engines, propellers, and accessories employ more than half a million people, from plant workers (some of whom learn their jobs after a few weeks of training) to engineers with advanced degrees.

10

11

11. Walter:

FIRST, WE VISITED THE EMPLOYMENT OFFICE WHERE WE SAW MEN AND WOMEN FILLING OUT APPLICATION FORMS WHILE WAITING FOR JOB INTERVIEWS.

12

12. Walter:

MR. MARTIN TOLD US THAT MANY AIRCRAFT PLANTS TRAIN PEOPLE FOR SOME JOBS SUCH AS DRILLING . . .

Nearly all aircraft plants offer some kind of training for unskilled and semi-skilled workers, such as drilling, riveting, soldering, and welding.

13

13. Walter:

. . .AND OPERATING A LATHE. THESE SIMPLE OPERATIONS ARE LEARNED IN TWO TO FOUR WEEKS, AND THE TRAINEES EARN WHILE THEY LEARN.

Apprentice training programs also are offered to qualified employees under company and union agreements. Such training for jobs as machinists, sheet metal workers, tool and die makers, and electronic technicians allows workers to advance to journeyman status and higher wages.

14

14. Walter:

SOMETIMES COURSES ARE SET UP AT THE AIRCRAFT PLANT UNDER THE MANPOWER DEVELOPMENT AND TRAINING ACT OF THE FEDERAL GOVERNMENT TO TRAIN BOTH YOUNG AND OLDER WORKERS.

15

15. Walter:

BUT IF A PERSON LEARNS A SKILL IN A VOCATIONAL SCHOOL FIRST, HE CAN START HIS CAREER AT A HIGHER RATE OF PAY AND ADVANCE FASTER.

16. Walter:

COURSES ARE OFTEN AVAILABLE FOR EMPLOYED WORKERS TO UP-GRADE THEIR SKILLS AND ADVANCE TO HIGHER PAYING JOBS. THEY ARE HELD IN THE PLANT OR AT ADULT VOCATIONAL SCHOOLS, AND WORKERS ATTEND CLASS ON THEIR OWN TIME.

Frequently employers pay some or all of the costs for classes outside the plant.

16

17. Walter:

AS WE ENTERED THE PLANT, WE SAW MATERIAL HANDLERS DELIVERING MATERIALS AND SUPPLIES TO WORKERS.

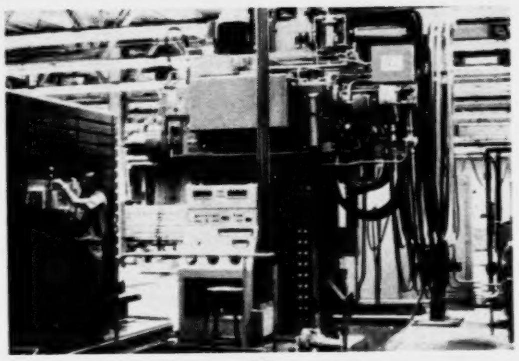
A material handler is an example of a semi-skilled worker, as is a truck driver, crane operator, shipping clerk, tool crib attendant, and guard.

17

18. Walter:

SKILLED WORKERS OPERATE HEAVY MACHINERY TO MAKE LARGE SECTIONS OF THE AIRCRAFT.

Plant workers with the greatest skills command the highest paying jobs among production workers. They are experts who do non-routine, precision work.



18

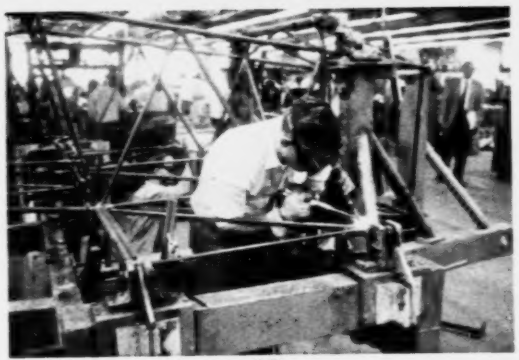
19. Walter:

AIRCRAFT SECTIONS ARE PUT TOGETHER WITH HUNDREDS OF THOUSANDS OF RIVETS, MAKING EASY-TO-LEARN JOBS FOR THOUSANDS OF RIVETERS.

19

20. Walter:

WE SAW WELDERS BUILDING THE FRAMEWORK FOR AIRCRAFT USED FOR CROP DUSTING . . .



20

21

21. Walter:

. . . AND ASSEMBLERS PREPARING TO PUT TOGETHER MAJOR AIRCRAFT SECTIONS SUCH AS THE WINGS AND FUSELAGE.

Some assemblers specialize in one kind of assembly work such as electrical systems, engines, and fuel systems. Others assemble small sections of the aircraft such as fuel tanks, wheels and hydraulic controls. Their work involves riveting, drilling, filing, bolting, soldering, cementing and glueing.

22

22. Walter:

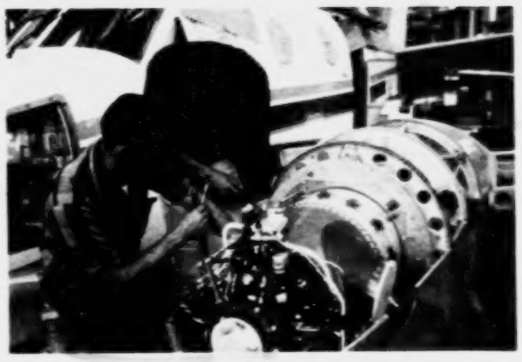
SOME INSTALLERS ADD WIRING FOR THE ELECTRICAL SYSTEMS, WHILE AT THE SAME TIME, OTHERS INSTALL HEATING AND VENTILATING SYSTEMS. . .

23

23. Walter:

. . .OR ELECTRONIC AIDS SUCH AS RADIO OR RADAR.

Electronic equipment aboard a big jet costs more than $200,000. Future aircraft will carry even more electronic gear, requiring additional workers in electronic assembly.



24

24. Walter:

POWER PLANT INSTALLERS MOUNT ENGINES . . .

25

25. Walter:

. . .WHILE ELECTRICIANS CHECK THE ELECTRICAL CIRCUITS. AN ELECTRICIAN IS A GOOD EXAMPLE OF A WORKER WHO HAS PROBABLY PREPARED FOR HIS JOB AT A VOCATIONAL SCHOOL.

26. Walter:

WHETHER LARGE...

26

27. Walter:

...OR SMALL, THE PLANES MOVE TOWARD COMPLETION.

> Rising sales of light aircraft, increases in the number of hours flown and in the number of pilots obtaining licenses, and new uses for light aircraft all point to continued expansion of production of light aircraft in the years ahead.

27

28. Walter:

SOME PRODUCTION WORKERS WORK ON AIRCRAFT AWAY FROM THE ASSEMBLY LINE, FOR EXAMPLE, ASSEMBLING LANDING GEAR WHEEL COVERS...

28

29. Walter:

...OR INSPECTING AIRCRAFT PARTS WITH PRECISION INSTRUMENTS.

29

30. Walter:

SOME SECTIONS OF PLANES ARE MADE OF PLASTIC WHICH IS MOLDED INTO SHAPE BY HAND...

30

31

31. Walter:

. . .OR CUT INTO SECTIONS WITH POWER TOOLS.

Working with plastics appeals to workers who prefer to handle lightweight materials.

32

32. Walter:

PAINTERS SPRAY ON AIRCRAFT PAINT AND MAKE THE FINAL TOUCH UP JUST BEFORE DELIVERY TO THE CUSTOMER.

33

33. Walter:

TRACTOR OPERATORS TOW FINISHED AIRCRAFT OUT OF THE PLANT TO THE RAMP FOR FINAL PRE-FLIGHT CHECKS.

34

34. Walter:

THE MODEL BUILDER, ESPECIALLY ONE WHO MAKES MODELS FOR WIND TUNNEL EXPERIMENTS, IS ONE OF THE MOST HIGHLY SKILLED WORKERS IN THE AIRCRAFT PLANT. THIS MAN MAY HAVE DEVELOPED HIS SKILL AT A VOCATIONAL SCHOOL.

35

35. Walter:

MODELS FOR ADVERTISING DISPLAYS, ORDERED BY CUSTOMERS, MUST BE BUILT TO EXACT SCALE.

Glueing, sanding, and painting are typical kinds of work performed by model builders.

36. Walter:

THERE ARE MANY PRODUCTION JOBS THAT WOMEN CAN DO AS WELL AS OR EVEN BETTER THAN MEN. . .RIVETING, FOR EXAMPLE. LINDA, WHAT KINDS OF WORK DID YOU SEE WOMEN DOING IN THE AIRCRAFT PLANT?

Women constitute a large portion of the plant workers in aircraft manufacturing.

36

37. Linda:

I SAW THEM WORKING ON JOBS USUALLY ASSOCIATED WITH WOMEN, SUCH AS SEWING UPHOLSTERY MATERIALS.

37

38. Linda:

BUT MORE OFTEN I SAW THEM DOING LIGHT WORK SUCH AS ELECTRICAL WIRING. WOMEN ARE BETTER THAN MEN IN JOBS REQUIRING DELICATE HAND OPERATIONS.

38

39. Linda:

WOMEN CLERKS ALSO KEEP TRACK OF PROGRESS OF WORK ON THE AIRCRAFT.

Most women clerks work in engineering, sales, purchasing, accounting, public relations, and industrial relations departments. These departments also employ women typists, stenographers, secretaries, and data processing personnel.

39

40. Linda:

INDUSTRIAL NURSING IS AN IMPORTANT CAREER FOR WOMEN, TOO, GUARDING EMPLOYEES' HEALTH, AND GIVING FIRST AID. IT WAS A SURPRISE TO ME TO FIND SO MANY WOMEN AT WORK IN AN AIRCRAFT PLANT, WALTER.

40

PEOPLES LIVES...
ALL OVER THE WORLD
DEPEND ON
YOUR WORKMANSHIP
LET'S BE CAREFUL!

41

41. Walter:

AND TO ME, TOO, LINDA. WHEREVER WE WENT IN THE AIRCRAFT PLANT, WE SAW SIGNS SUCH AS THIS ONE REMINDING WORKERS OF THE IMPORTANCE OF DOING THEIR JOBS CAREFULLY, SAFELY, AND THOROUGHLY.

No industry is more conscious of the need for careful and thorough work than is the aircraft manufacturing industry. Emphasis is on perfection.

42

42. Walter:

TO ASSURE QUALITY WORKMANSHIP, INSPECTORS ROAM THE PLANT, CHECKING FINISHED WORK AND HELPING WORKERS WITH INSTALLATION OR ASSEMBLY PROBLEMS.

43

43. Walter:

WE LEARNED THAT THE AIRCRAFT MANUFACTURING INDUSTRY IS ONE OF THE LARGEST EMPLOYERS OF ALL KINDS OF ENGINEERS.

Aircraft manufacturers use many kinds of engineers and scientists: aeronautical, electronics, chemical, ceramic, mechanical, electrical, industrial and metallurgical, to name some of the most important.

44

44. Walter:

ENGINEERS DESIGN NEW KINDS OF EXPERIMENTAL AIRCRAFT, PLAN IMPROVEMENTS FOR PLANES ALREADY IN USE . . .

More than half the engineers work on research and development projects, while the remainder are concerned with production planning, quality control, tool design, technical sales and service, technical writing and related fields.

45

45. Walter:

. . .AND INTERPRET RESULTS OF ENGINEERING TESTS. LINDA, DID YOU SEE ANY WOMEN ENGINEERS?

46. Linda:

YES, I DID. WOMEN ARE ENTERING THE ENGINEERING PROFESSION, DOING THE SAME KINDS OF ENGINEERING WORK AS MEN, SUCH AS PREPARING ENGINEERING DATA FOR A COMPUTER. . .

Women engineers are presently in the minority, but opportunities for placement in the years ahead are excellent.

46

47. Linda:

. . .OR SUPERVISING THE INSTALLATION OF TEST INSTRUMENTS IN A MODEL PLANE FOR A WIND TUNNEL TEST.

47

48. Linda:

WOMEN HAVE AN IMPORTANT PLACE IN AVIATION MANUFACTURING WHETHER AS PRODUCTION WORKERS, CLERKS, TECHNICIANS, ENGINEERS. . .AND EVEN AS PRESIDENT OF AN AIRCRAFT MANUFACTURING COMPANY, WALTER.

48

49. Walter:

ENGINEERS ARE ASSISTED BY TECHNICIANS SUCH AS DRAFTSMEN, OR "DRAFTSWOMEN", WHO PREPARE ENGINEERING DRAWINGS. A CAREER AS A DRAFTSMAN CAN BEGIN WITH TRAINING AT A VOCATIONAL SCHOOL.

Technicians perform experiments and tests, operate instruments, and make drawings and computations under the direction of engineers and scientists. Technicians usually specialize in one area of science or engineering. About two technicians are employed for every five engineers and scientists.

49

50. Walter:

THE AIRCRAFT MANUFACTURING INDUSTRY IS ALWAYS IMPROVING THE SAFETY AND PERFORMANCE OF AIRPLANES. FOR EXAMPLE, WITHIN THE NEXT TEN YEARS THEY PROBABLY WILL BUILD THE SUPERSONIC TRANSPORT, OR SST.

SST
DEVELOPMENT
CENTER

50

51

51. Walter:

WE SAW THE FULL SCALE MODEL OF THIS HUGE PLANE–AS LONG AS A FOOTBALL FIELD–THAT WILL FLY 18 HUNDRED MILES PER HOUR, AND CARRY MORE THAN 300 PASSENGERS FROM NEW YORK TO PARIS IN LESS THAN THREE HOURS.

52

52. Walter:

THE HUGE JET ENGINES OF THE SST WILL GENERATE ENOUGH POWER TO LIGHT 70 THOUSAND HOMES. JUST BUILDING THE SST WILL CREATE 150 THOUSAND NEW JOBS. THE WORKERS WHO GET EARLY TRAINING IN A JOB SKILL AT A VOCATIONAL SCHOOL WILL HAVE PREFERENCE OVER THE UNTRAINED WORKER EVERY TIME.

Already the development of the SST and the 300-400 passenger jumbo jets is increasing employment in the plants where they will be produced.

53

53. Walter:

BEFORE WE HEAR FROM BILL ABOUT FLYING CAREERS, I WANT TO MAKE THIS POINT: ALTHOUGH PLANES ARE PRODUCED IN ABOUT 21 LARGE PLANTS . . .

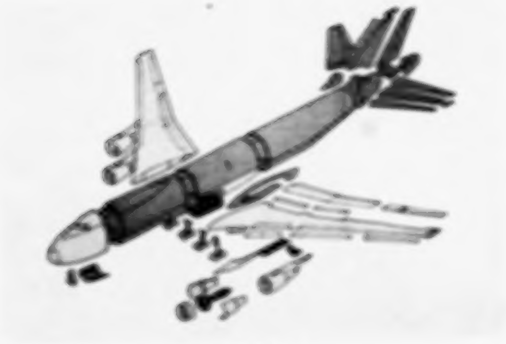
Most major aircraft manufacturers are located on the west coast, in California and Washington. Other large companies are located in Texas, Kansas, Missouri, New York, Connecticut, New Jersey, Massachusetts, Pennsylvania, Maryland, Georgia, and Florida.

54

54. Walter:

. . .ORDERS FOR MANY DIFFERENT PARTS SUCH AS INSTRUMENTS ARE GIVEN TO SMALLER MANUFACTURING FIRMS SCATTERED THROUGHOUT THE NATION.

One estimate indicates that more than 50,000 small firms in every state of the Union furnish such aircraft supplies and parts as bearings, forgings, lubricants and subassemblies–tail structures and landing gears, for example. One major company alone buys items from more than 20,000 smaller firms.



55

55. Walter:

FOR EXAMPLE, ABOUT 65 PER CENT OF THE AIRFRAME WEIGHT OF THIS SUPERJET AIRLINER WILL BE MADE OUTSIDE THE AIRCRAFT PLANT BY 7 MAJOR SUBCONTRACTORS, EACH ONE OF WHICH IS REPRESENTED BY A DIFFERENT COLOR IN THIS CHART. IN TURN, THESE SEVEN SUBCONTRACTORS WILL BUY PARTS MADE IN THOUSANDS OF SMALLER SHOPS ALL OVER THE COUNTRY.

56. Walter:

SO JUST BECAUSE YOU MAY NOT LIVE NEAR A LARGE AIRCRAFT PLANT DOESN'T MEAN YOU CAN'T WORK IN THE AIRCRAFT MANUFACTURING INDUSTRY. THE CHANCES ARE THAT WHEREVER YOU LIVE, YOU WON'T BE TOO FAR FROM JOB OPPORTUNITIES IN AIRCRAFT MANUFACTURING. . .O.K., BILL, IT'S YOUR TURN NOW TO REPORT ON CAREERS FOR AIRPLANE PILOTS.

56

57. Bill:

AT THE AIRPORT WE SAW SEVERAL TYPES OF CAREER PILOTS, THAT IS, PILOTS WHO EARN THEIR LIVING FLYING PLANES. MR. CHAPMAN, ON THE RIGHT, IS A FLIGHT INSTRUCTOR WHO TEACHES SOME OF THE 95,000 NEW STUDENT PILOTS WHO LEARN TO FLY EACH YEAR.

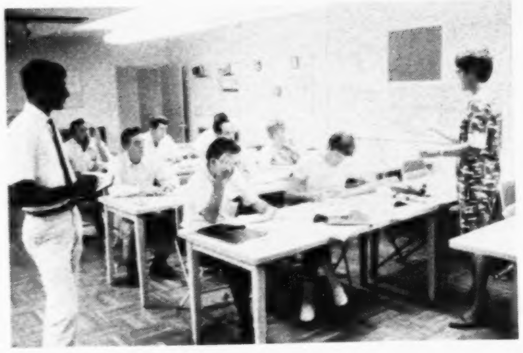
Flight instructors are found at most all airports. Many double as air taxi or charter pilots when not instructing students.

57

58. Bill:

BOTH WOMEN AND MEN PILOTS TEACH GROUND SCHOOL CLASSES, TOO, PREPARING STUDENT PILOTS FOR THEIR WRITTEN EXAMS.

A job as a flight instructor is not always considered a career in itself, but as a stepping stone to other kinds of piloting opportunities requiring many hours of flying experience, such as corporate or airline pilot.



58

59. Bill:

A MORE HIGHLY SKILLED, EXPERIENCED PILOT CAN BECOME A CORPORATE PILOT. HE FLIES THE OFFICERS OF A CORPORATION ALL OVER THE COUNTRY IN A COMPANY-OWNED PLANE. I ASKED MR. ALLEN, A CORPORATE PILOT, WHAT HE THOUGHT ABOUT THE FUTURE OF CORPORATE FLYING.

Corporate pilots enjoy the variety of flying experiences resulting from their jobs: no set schedules, challenging weather conditions, and unfamiliar airports and terrain.

59

60. Mr. Allen:

EACH YEAR MORE COMPANIES ARE BUYING THEIR OWN PLANES AS EXECUTIVES REALIZE HOW MUCH TIME THEY CAN SAVE TRAVELING IN A COMPANY-OWNED PLANE. THE FUTURE FOR CORPORATE PILOTS IS BRIGHT, BILL.

The growth of business flying is expected to require 1200 to 1600 pilots a year.

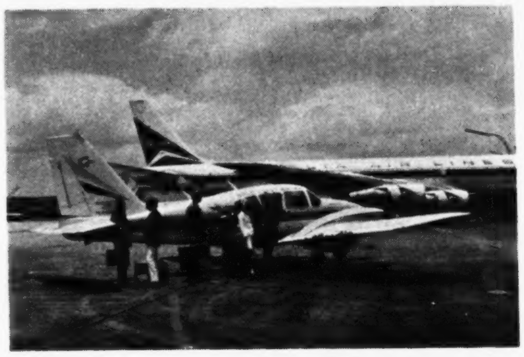
60

61

61. Bill:

NEW AIRCRAFT OFTEN ARE DELIVERED TO CUSTOMERS BY PILOTS WHO FLY, OR FERRY, THE NEW PLANES FROM THE AIRCRAFT PLANT TO THE CUSTOMER'S HOME AIRPORT.

Both men and women are employed as ferry pilots. Many of their flights are to overseas destinations.

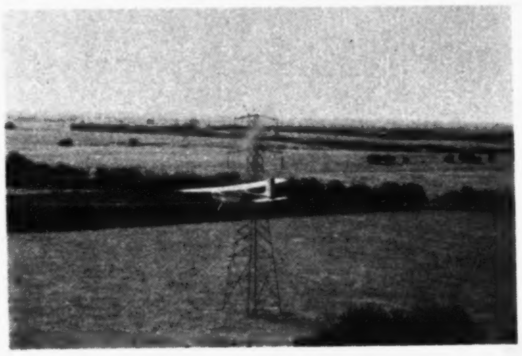


62

62. Bill:

PILOTS ARE NEEDED FOR THE GROWING AIR TAXI BUSINESS WHICH FLIES THREE TIMES AS MANY PLANES AS ALL THE AIRLINES COMBINED. "FLY ALL THE WAY" IS THEIR MOTTO AS THEY TAKE AIRLINE PASSENGERS TO AIRPORTS NOT SERVED BY AIRLINES, OR AIRLIFT PEOPLE WHO WANT TO GET SOME PLACE IN A HURRY.

Air taxi flying is the fastest growing segment of general aviation. Air taxi companies operate more than three times as many planes as U.S. domestic airlines. Air taxi passengers in 1966 increased 47 per cent over the previous year; in 1967 the increase was 69 per cent over 1966.



63

63. Bill:

THERE ARE NUMEROUS OTHER KINDS OF PILOT JOBS IN AVIATION –FOR EXAMPLE, THE PILOT WHO PATROLS POWER LINES...

64

64. Bill:

...OR WHO FLIES A HELICOPTER ON THE MANY JOBS ESPECIALLY SUITED TO THE WHIRLYBIRD, SUCH AS LIFTING HEAVY LOADS...

65

65. Bill:

...OR PATROLLING HIGHWAY TRAFFIC.

66. Bill:

ALSO, A MILITARY FLYING CAREER ATTRACTS MANY YOUNG MEN.

Military pilots fly cargo, tanker and transport planes as well as fighters, bombers and reconnaissance aircraft.

66

67. Bill:

THE AIRLINE CAPTAIN IS THE TOP RANKING PILOT IN CIVIL AVIATION. YOU CAN ALWAYS SPOT HIM BY THE FOUR STRIPES ON HIS SLEEVE. WE ASKED CAPTAIN MCKENZIE TO COMMENT ON THE CAREER OF AN AIRLINE PILOT.

The airline captain holds the highest grade flying license—the ATR or Air Transport Rating. It is the equivalent in training and potential earning power of Doctor of Medicine or Doctor of Laws degrees.

67

68. Capt. McKenzie:

THERE'S NO SHORT AND EASY ROAD TO THE AIRLINE PILOT'S JOB. IN FACT, THE TRAINING PERIOD NECESSARY TO WIN HIS STRIPES IS OFTEN LONGER THAN THE AVERAGE DOCTOR'S. IT TAKES ABOUT TEN TO TWELVE YEARS AND MANY HOURS OF STUDY AND TRAINING TO EARN A CAPTAINCY.

68

69. Capt. McKenzie:

THE AIRLINE CAPTAIN MAY START HIS AIRLINE FLYING CAREER AS A FLIGHT ENGINEER, OR SECOND OFFICER. SITTING BEHIND THE CO-PILOT, THE FLIGHT ENGINEER MONITORS THE ENGINE GAUGES, AND DOZENS OF OTHER SWITCHES AND DIALS.

Many new flight engineers have gained their required flying hours as former air taxi pilots or flight instructors.

69

70. Capt. McKenzie:

THE CO-PILOT, OR FIRST OFFICER, SITS IN THE RIGHT HAND SEAT AND HELPS THE CAPTAIN FLY THE AIRPLANE. WHEN HE EARNS HIS CAPTAIN'S STRIPES HE MOVES OVER INTO THE LEFT SEAT AND THEN HE'S IN COMMAND OF THE PLANE.

It takes a co-pilot from five to twelve years to become a pilot, depending upon the number of co-pilots having more seniority.

70

71

71. Capt. McKenzie:

THE FLIGHT CREW'S FLYING SKILLS MUST BE KEPT AT THEIR HIGHEST PEAK SO THEY MUST SPEND MANY HOURS IN SIMULATORS PRACTICING THEIR SKILLS. A CAPTAIN CAN NEVER STOP LEARNING AND EXPECT TO HOLD HIS JOB, BILL.

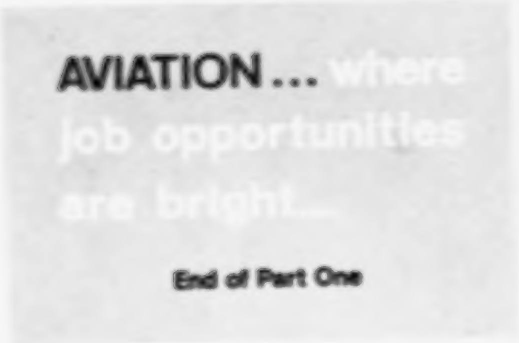
> Training is continuous even after the pilot has won his stripes. He must maintain flight proficiency and learn constantly changing flight regulations and how to handle new kinds of equipment and aircraft as they are put into service by his airline.

72

72. Bill:

WHAT CAPT. MCKENZIE DIDN'T TELL US IS THAT THE AIRLINE PILOT ENJOYS THE PRESTIGE THAT COMES WITH A TOP RANKING JOB, AND CAN EARN A MILLION DOLLARS IN HIS WORKING LIFETIME, IF HE STARTS SOON ENOUGH. . .AND NOW, DENNIS, LET'S HEAR WHAT YOU LEARNED ABOUT THE AVIATION MECHANIC.

> Pilots on international airlines usually earn the highest salaries. Earnings also depend on the type of airplane flown, and seniority.



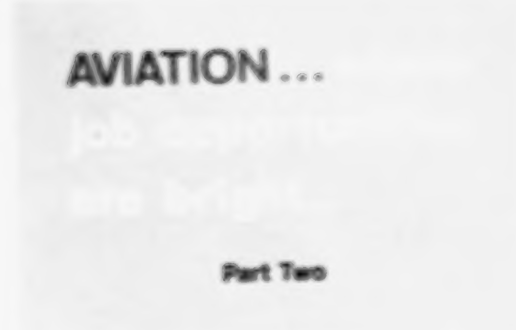
AVIATION... where job opportunities are bright...

End of Part One

73

73. AVIATION. . .WHERE CAREER OPPORTUNITIES ARE BRIGHT. . .

END OF PART ONE



AVIATION...
job opportunities are bright...

Part Two

74

74. AVIATION. . .WHERE CAREER OPPORTUNITIES ARE BRIGHT. . .

BEGINNING OF PART TWO

75

75. Dennis:

THE AVIATION MECHANIC IS IN DEMAND EVERYWHERE PLANES FLY. HE MAY BE A LINE-MAINTENANCE MECHANIC. . .THAT IS, AN ALL-AROUND MECHANIC ABLE TO REPLACE WORN PARTS ON AN AIRPLANE ENGINE. . .

> Line mechanics who work on all parts of the airplane and its engines usually have an Airframe and Powerplant (A&P) license issued by the Federal Aviation Administration after successfully passing oral, written, and practical examinations.

76. Dennis:

. . .OR REPAIR A DAMAGED FUSELAGE SECTION

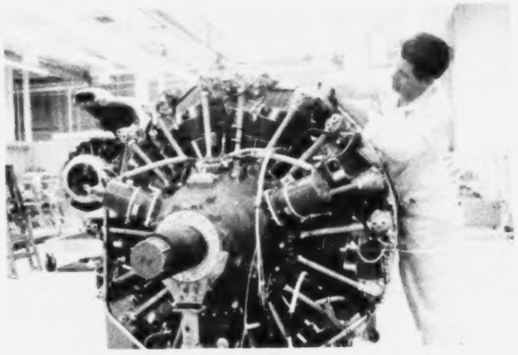
Repairing the fuselage, wings, and tail assembly requires an ability to work with metal, fabrics, plastics, and wood.

76

77. Dennis:

HE MAY WORK IN A SHOP SPECIALIZING IN REPAIRING AIRCRAFT ENGINES. . .

Some repair shops specialize in servicing or overhauling certain parts of the airplane, such as propellers, engines, flight instruments, or avionics equipment.

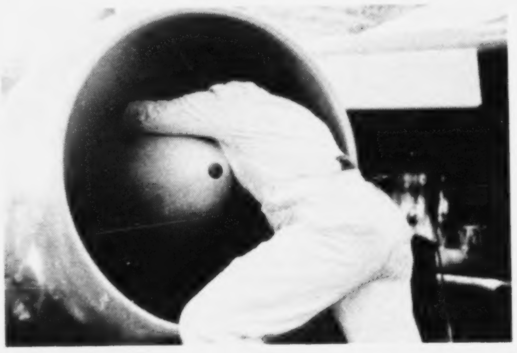


77

78. Dennis:

. . .OR ON A JET ENGINE AT AN AIRLINE OVERHAUL BASE.

Mechanics at airline overhaul bases usually specialize in one kind of work such as engines, propellers, aircraft instruments, airframe repairs, and electrical equipment.

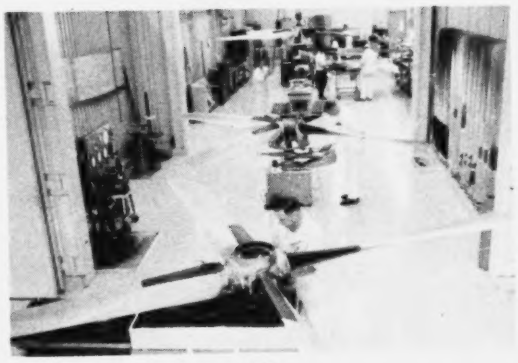


78

79. Dennis:

OR HE MAY SPECIALIZE IN TESTING AND SERVICING PROPELLERS...

It takes about 75 man-hours to completely tear down and overhaul a big Convair 440 propeller. Just inspection alone requires 40-man-hours.



79

80. Dennis:

. . .OR FLIGHT INSTRUMENTS SUCH AS COMPASSES, GAUGES, ALTIMETERS AND RADIOS.

80

81

81. Dennis:

ALTHOUGH MOST AVIATION MECHANICS ARE MEN, THERE'S WORK FOR WOMEN AVIATION MECHANICS, TOO–SUCH AS DELICATE SOLDERING WORK WHICH WOMEN SEEM MORE SUITED FOR THAN MEN.

82

82. Dennis:

FREQUENTLY, AVIATION MECHANICS WORK OUTDOORS ON PLANES WITH MINOR TROUBLES THAT CAN BE FIXED QUICKLY. EVERY TIME A PLANE TOUCHES DOWN AT MOST AIRPORTS, A MECHANIC IS ON THE SCENE TO TEND TO ITS NEEDS.

Protective clothing and shelters are often provided to lessen discomfort when unpleasant weather conditions exist.

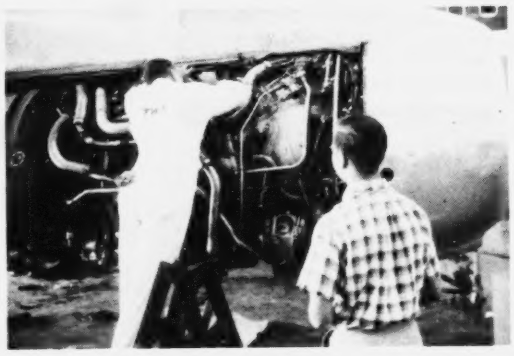
PORT SER
MILITAR

83

83. Dennis:

MANY MECHANICALLY-MINDED YOUNG MEN BECOME AVIATION MECHANICS DURING THEIR MILITARY SERVICE. WITH SOME ADDITIONAL STUDY THEY CAN GET AN AVIATION MECHANIC'S JOB WHEN THEY LEAVE THE SERVICE.

The military aviation mechanic has a more specialized job than the civilian aviation mechanic. Therefore he must take the FAA exams if he wants to have an aviation mechanic's job when he finishes his military service.

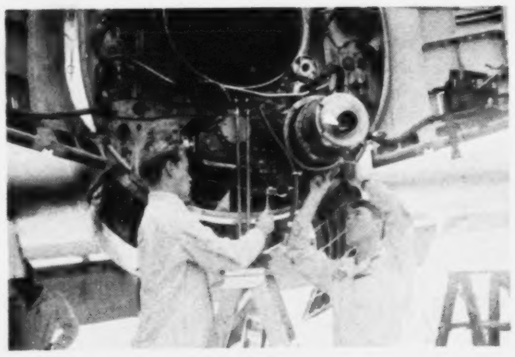


84

84. Dennis:

AN AVIATION MECHANIC MUST WORK CAREFULLY. HE KNOWS THAT SLOPPY WORK IS A REAL THREAT TO AIRCRAFT SAFETY.

Lives depend to a great degree on the quality of an aviation mechanic's work and his attitude toward his job.



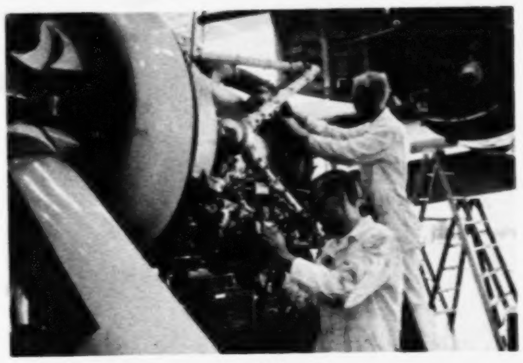
85

85. Dennis:

IN FACT, WHEN AN AVIATION MECHANIC COMPLETES HIS TRAINING AT A VOCATIONAL-TECHNICAL SCHOOL AND RECEIVES HIS FEDERAL AVIATION ADMINISTRATION LICENSE, HE PLEDGES HIMSELF...

86. Dennis:

. . . TO ALWAYS KEEP IN MIND THAT THE SAFETY AND LIVES OF OTHERS DEPEND ON HIS SKILL AND JUDGMENT . . .



86

87. Dennis:

. . . AND THAT HE WILL NEVER ALLOW AN AIRPLANE OR ANY EQUIPMENT ON WHICH HE HAS WORKED TO BE PUT INTO SERVICE IF HE HAS ANY DOUBTS ABOUT ITS AIRWORTHINESS.

87

88. Dennis:

WORKING AS A LINEMAN FOR AN AIRPLANE SERVICE STATION, OR FIXED BASE OPERATOR, HAS GIVEN MANY MECHANICS THEIR START IN AVIATION. A LINEMAN FUELS A PLANE.

Many well known and successful pilots flying today earned money for their first flying lessons while working as linemen for fixed base operators.

CHEVRON
N43

88

89. Dennis:

. . .CHECKS THE OIL AND CLEANS THE WINDSHIELD.

An alert lineman can be of great service to a customer if he spots an oil leak or other potential troublemaking conditions when he services the airplane.

89

90. Dennis:

. . . AND DIRECTS THE PILOTS TO A PARKING AREA AND OFTEN HELPS TIE DOWN THE AIRCRAFT.

The lineman is often the first person a pilot-customer sees. A courteous, clean and neatly dressed lineman is a good advertisement for his employer.

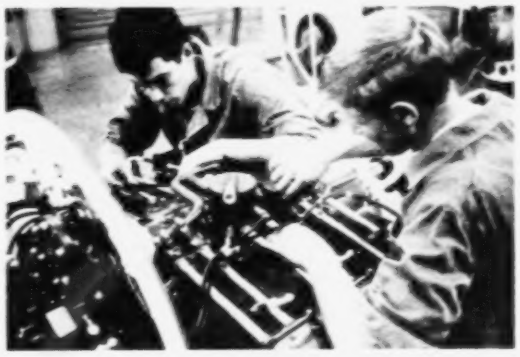
90

91

91. Dennis:

A LINEMAN CAN BE AN APPRENTICE TO A LICENSED AVIATION MECHANIC AND MAKE MINOR REPAIRS, LEARNING AS HE EARNS.

Many such apprentices use their earnings to enroll in a FAA-certificated aviation mechanics school.



92

92. Dennis:

BUT HE CAN BECOME A TRAINED AVIATION MECHANIC WITH A MUCH HIGHER RATE OF PAY AND EARN HIS LICENSE MUCH SOONER, IF HE GOES TO AN FAA-CERTIFICATED MECHANICS SCHOOL.

93

93. Dennis:

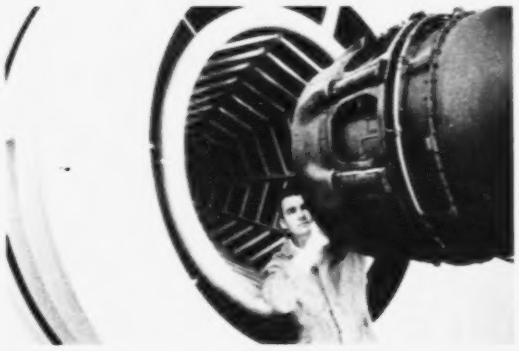
THE FAA HAS CERTIFICATED MANY PUBLIC AND PRIVATE SCHOOLS. SOME OF THESE ARE VOCATIONAL-TECHNICAL SCHOOLS; OTHERS ARE TWO-YEAR JUNIOR COLLEGES WITH COURSES LEADING TO AN ASSOCIATE DEGREE.

The more than 75 FAA-certificated aviation mechanics schools are located in all parts of the country.

94

94. Dennis:

SEVERAL COLLEGES OFFER A 4-YEAR COURSE LEADING TO A B.S. DEGREE IN AERONAUTICAL MAINTENANCE.



95

95. Dennis:

IN THESE SCHOOLS, STUDENTS LEARN TO USE COMPLICATED LABORATORY EQUIPMENT SUCH AS THIS JET ENGINE TEST CELL. . .

96. Dennis:

. . . WITH BANKS OF DIALS, SWITCHES AND THROTTLES IN THE CONTROL ROOM. TODAY'S AVIATION MECHANIC IS NOT JUST A GREASE MONKEY WITH A WRENCH. HE'S A WELL-TRAINED WORKER WHOSE PRIDE IN HIS WORK AND DEDICATION TO SAFETY ARE MAJOR REASONS WHY FLYING HAS SUCH A HIGH SAFETY RECORD. . .LINDA, ARE YOU READY TO REPORT ON CAREER OPPORTUNITIES WITH THE AIRLINES?

96

97. Linda:

YES, I AM, DENNIS. . .MR. WARREN, A REPRESENTATIVE OF THE AIRLINE, MET US AT THE AIR TERMINAL AND INTRODUCED US TO SOME OF THE MANY CAREERS IN COMMERCIAL AIR TRANSPORTATION.

There are more than 75 different kinds of jobs in the airline industry.

TRANS WORLD AIRLINES

97

98. Linda:

FIRST, WE VISITED THE RESERVATIONS OFFICE AND WATCHED RESERVATIONS SALES AGENTS HANDLING CUSTOMERS' TELEPHONE INQUIRIES ABOUT FLIGHTS AND FARES.

A pleasant telephone voice, a courteous manner, and a thorough knowledge of flight schedules and fares are important factors in achieving success as a reservations sales agent.

98

99. Linda:

BOTH MEN AND WOMEN ARE TRAINED BY THE AIRLINE TO OPERATE THE COSTLY AUTOMATIC RESERVATIONS EQUIPMENT.

Reservations service is usually available to customers 24 hours a day, requiring rotating shifts and skeleton crews during night hours. Many airlines accept part-time help for this kind of work.

99

100. Linda:

TICKET AGENTS SELL TICKETS, CHECK IN BAGGAGE, AND ANSWER QUESTIONS ABOUT FLIGHTS AND FARES.

100

101

101. Linda:

WHITE GLOVED GROUND HOSTESSES, WHO DO NOT FLY, ROAM THE TERMINAL, LENDING A HELPING HAND TO PASSENGERS WHO HAVE MISSED THEIR FLIGHTS OR LOST THEIR BAGGAGE.

Some airlines use women ticket agents as ground hostesses, for a knowledge of flight schedules and fares is often required to help air travelers.

102

102. Linda:

RAMP SERVICEMEN LOAD BAGGAGE ABOARD THE AIRPLANE . . .

103

103. Linda:

. . .OR DRIVE SERVICE EQUIPMENT SUCH A FOOD TRUCKS. . .

104

104. Linda:

. . .OR FUEL THE AIRPLANE.

105

105. Linda:

STILL OTHER RAMP SERVICEMEN ARE TRAINED TO FRESHEN UP THE CABIN IN THE FEW MINUTES ALLOWED BETWEEN FLIGHTS.

This job involves a variety of tasks such as vacuuming carpets, cleaning windows, replacing linens, collecting items left behind by passengers and, refilling seat packets with airline literature.

106. Linda:

OTHER WORKERS CLEAN THE AIRPLANE'S EXTERIOR. WASHING AIRPLANES IS A NECESSARY JOB, FOR DIRT ON AN AIRLINER'S SURFACE COULD REQUIRE AN EXTRA TWO TONS OF FUEL ON A TRANSCONTINENTAL FLIGHT.

An airliner is washed about once a week to prevent corrosion, lessen aerodynamic drag, and present a sparkling appearance to customers.

106

107. Linda:

FLIGHT KITCHENS OFFER JOBS FOR WOMEN, PREPARING FLIGHT MEALS AND SETTING UP MEAL TRAYS.

107

108. Linda:

WE WERE SURPRISED TO FIND AUTO MECHANICS WORKING FOR AN AIRLINE. . .BUT, OF COURSE, THEY ARE NEEDED TO KEEP THE GROUND SERVICE EQUIPMENT IN WORKING ORDER. AUTO MECHANICS CAN GET TRAINING IN VOCATIONAL SCHOOLS, TOO.

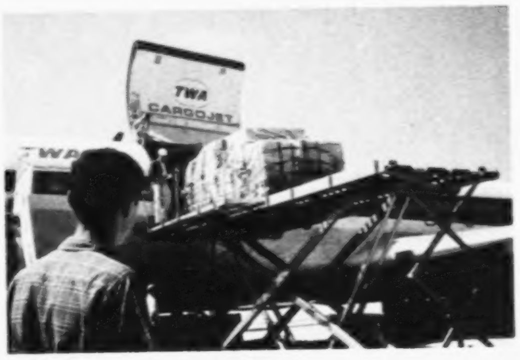
A large airline may have as many as 20 different types of ground equipment such as baggage loaders, fork trucks, employees buses, and movable stairs, all of which need the services of auto mechanics.

108

109. Linda:

WE ALSO SAW AIR CARGO HANDLERS LOADING BIG JET FREIGHTERS. . .

To load and unload air cargo, cargo handlers use a variety of mechanical aids such as conveyors, roller pallets, and fork lifts.



109

110. Linda:

. . . AND RAMP PLANNERS WHO KEEP TRACK OF EACH ARRIVING PLANE AND SEND MECHANICS, BAGGAGE TRUCKS, AND CLEANING CREWS TO SERVICE IT.

Ramp planners usually are former ramp servicemen who have shown a capability for management duties.

110

111

111. Linda:

TELETYPISTS SEND MESSAGES OVER THE AIRLINE'S COMMUNICATIONS NETWORK.

Most airline teletypists are women.

112

112. Linda:

DESIGN ENGINEERS SELECT FABRICS TO BRIGHTEN THE AIRCRAFT'S INTERIOR.

113

113. Linda:

A CAREER AS A STEWARDESS IS GLAMOROUS AND EXCITING, BUT IT ALSO MEANS HARD WORK.

The stewardess must accept irregular working hours, separation from her family, and hours of duty on her feet. In exchange she has the opportunity to be of service to the public, to travel extensively, and to meet thousands of people.

114

114. Linda:

STEWARDESS CANDIDATES USUALLY ATTEND AN AIRLINE TRAINING SCHOOL FOR 4 TO 6 WEEKS. THEY LEARN ABOUT AIRLINE ROUTES AND AIR REGULATIONS...

In-flight service, passenger psychology, public relations, and safety procedures are among the subjects studied by stewardess candidates.

115

115. Linda:

...AND THE PARTS OF THE AIRLINER AND HOW THEY OPERATE...

116. Linda:

. . .HOW TO USE THE PLANE'S TINY GALLEY AND SERVE MEALS TO PASSENGERS. . .

116

117. Linda:

. . .AND HOW TO MAKE THE MOST OF THEIR NATURAL LOVELINESS.

Courses in hair styling, fashion, make-up, posture and figure control are a part of every stewardess candidate's study program. Uniforms are designed by big names in the fashion world.

117

118. Linda:

THE STEWARDESS IS THE AIRLINE EMPLOYEE WITH WHOM THE PASSENGER HAS THE CLOSEST RELATIONSHIP. HER SMART APPEARANCE, HELPFUL ATTITUDE, AND COMPETENT SERVICE ARE THE TOOLS OF HER TRADE.

118

119. Linda:

SHE IS ALWAYS "ON THE GO". . .AN ATTRACTIVE, LIVING ADVERTISEMENT FOR HER AIRLINE.

A stewardess is paid to fly from 55 to 85 hours a month, but spends additional hours on the ground attending pre-flight briefings or making reports on flights completed. Over a year's time, her time off amounts to about 156 days–about two months more free time than if she held an office job.

119

120. Linda:

THE TURNOVER IN THIS CAREER FIELD IS RAPID, AS THE AVERAGE STEWARDESS SPENDS LESS THAN TWO YEARS ON HER JOB. THIS CREATES A CONSTANT DEMAND FOR STEWARDESSES.

120

TWA

121

121. Linda:

AIRLINES EMPLOY MANY OTHER KINDS OF WORKERS, SUCH AS DISPATCHERS, RADIO OPERATORS, AND CLERKS, AS WELL AS FLIGHT PERSONNEL. ALL THE AIRLINE WORKERS IN THIS PICTURE ARE INVOLVED IN SERVICING AND OPERATING A TYPICAL SCHEDULED FLIGHT.

TRANS WORLD AIRLINES

122

122. Linda:

THE AIRLINE INDUSTRY IS ONE OF THE FASTEST GROWING INDUSTRIES IN THE COUNTRY. EVERY YEAR MORE PEOPLE ARE USING THE AIRLINES . . .

Airline passenger-miles reported in 1966 are expected to double in volume by 1970 and triple by 1975.

123

123. Linda:

. . .AND THE AIR CARGO BUSINESS HAS GROWN MUCH FASTER THAN AIRLINE OFFICIALS HAD HOPED.

U. S. scheduled airlines will more than double their jet freighter fleets and cargo-lift capability by 1970.

124

124. Linda:

THE AIRLINES HAVE ORDERED MANY NEW JET AIRCRAFT AND MORE PEOPLE WILL BE NEEDED TO FLY AND SERVICE THESE NEW ADDITIONS TO THE AIRLINE FLEET.

The jumbo jets will require ten stewardesses aboard as compared with three or four today.

125

125. Linda:

THE AIRLINE INDUSTRY IS A BIG AND EXCITING CAREER FIELD. IT HAS A BRIGHT FUTURE WITH MANY OPPORTUNITIES FOR QUALIFIED PEOPLE. . .AND NOW, BILL WILL FINISH OUR REPORT AS HE TELLS YOU ABOUT SOME AVIATION JOBS IN GOVERNMENT.

126. Bill:

WHILE WE WERE AT THE AIRPORT, WE VISITED THE CONTROL TOWER TO WATCH AIR TRAFFIC CONTROLLERS AT WORK.

FAA control towers are located at more than 300 airports throughout the country.

126

127. Bill:

THESE FEDERAL AVIATION ADMINISTRATION CONTROLLERS DIRECT PLANES ON THE GROUND AND CLEAR PILOTS FOR TAKE-OFFS AND LANDINGS.

127

128. Bill:

OTHER CONTROLLERS SEPARATE AIRPLANES BY RADAR, ADVISING PILOTS OF AIR TRAFFIC CONDITIONS NEAR THE AIRPORT.

Air traffic controllers also work at FAA Air Route Traffic Control Centers, directing air traffic that is outside an airport control zone but within the boundaries of the Center's control area, an area encompassing a number of states or parts of states.

128

129. Bill:

THE FEDERAL AVIATION ADMINISTRATION ALSO EMPLOYS MORE THAN 8 THOUSAND ELECTRONIC TECHNICIANS AND ENGINEERS TO TROUBLESHOOT AND INSTALL RADAR AND COMMUNICATIONS EQUIPMENT.

129

130. Bill:

FAA TECHNICIANS LEARN THEIR SPECIAL JOBS AT THE FAA AERONAUTICAL CENTER IN OKLAHOMA CITY. THEY ARE TAUGHT HOW TO INSTALL AND TROUBLESHOOT SPECIAL AIRPORT AND AIRWAYS NAVIGATIONAL AIDS, RADAR . . .

130

131

131. Bill:

. . . COMMUNICATIONS AND DATA PROCESSING EQUIPMENT. MOST OF THESE STUDENTS ATTENDED A VOCATIONAL-TECHNICAL SCHOOL FOR TWO YEARS, LEARNING BASIC ELECTRONICS BEFORE GOING TO THE AERONAUTICAL CENTER.

132

132. Bill:

WE ALSO VISITED THE WEATHER BUREAU WHERE WE LEARNED HOW IMPORTANT WEATHER FORECASTING AND REPORTING ARE FOR SAFE FLYING.

About 1,900 meteorologists are employed in the Weather Bureau's 300 stations scattered throughout the country. Airlines employ about 300 weathermen.

133

133. Bill:

WEATHER INFORMATION IS TRANSMITTED AUTOMATICALLY TO AIR TRAFFIC CONTROL TOWERS, TO AIRLINE DISPATCH OFFICES, AND TO FAA FLIGHT SERVICE STATIONS WHERE SPECIALISTS HELP GENERAL AVIATION PILOTS PLAN SAFE FLIGHTS.

134

134. Bill:

MANY STATIONS ARE OPEN 24 HOURS A DAY, WITH SPECIALISTS ALWAYS READY TO ANSWER A PILOT'S RADIOED REQUEST FOR INFORMATION, TO GIVE HIM A NAVIGATIONAL FIX IF HE'S LOST, OR TO START A SEARCH FOR HIM IF HE'S OVERDUE.

135

135. Bill:

THE FAA ALSO EMPLOYS INSPECTORS TO VISIT AIRCRAFT REPAIR STATIONS TO SEE IF THE AVIATION MECHANIC'S WORK IS UP TO STANDARD.

FAA inspectors also check out the quality of materials and workmanship at aircraft manufacturing plants, and visit FAA-certificated mechanics schools to make sure instruction comes up to FAA standards.

136. Bill:

WE'VE SHOWN YOU ABOUT 50 DIFFERENT JOB OPPORTUNITIES IN AVIATION, AND THIS IS NOT THE END OF THE LIST. THERE ARE MANY MORE–RANGING FROM THE AIRPORT ELECTRICIAN WHO MAINTAINS RUNWAY LIGHTS AND AIRPORT BEACONS. . .

136

137. Bill:

. . . AND THE AIRPORT MAINTENANCE WORKER WHO HAS A VARIETY OF DUTIES SUCH AS SNOW REMOVAL. . .

Airport workers repair runways and maintain airport buildings and grounds, too.

137

138. Bill:

. . . THE AIRPLANE SALESMAN . . .

The airplane salesman should be a pilot in order to demonstrate the aircraft he sells. He must also understand the various parts of the aircraft and the accessories and systems that can be added to increase flight performance.

138

139. Bill:

. . .AND EVEN AVIATION EDUCATIONISTS. THIS CAREER, INCIDENTALLY, IS A FAST GROWING ONE AS MORE AND MORE HIGH SCHOOLS AND COLLEGES ARE OFFERING GROUND SCHOOL AND EVEN FLIGHT TRAINING COURSES.

Some aviation educationists are employed by airplane manufacturers, the Civil Air Patrol, state aeronautics commissions, and the airlines. They assist teachers who wish to use aviation materials in their classes. Others teach high school classes and flight training courses.

139

140. Bill:

OUR COMMITTEE MEMBERS BELIEVE THAT NO MATTER WHERE YOU START–AS A PRODUCTION WORKER IN AN AIRCRAFT PLANT. . .

140

141

141. Bill:

. . . A LINEMAN AT AN AIRPORT . . .

CALIFORNIA AVIATION SERVICE IN
COMPLETE FLIGHT TRAINING CENTER
N658R

142

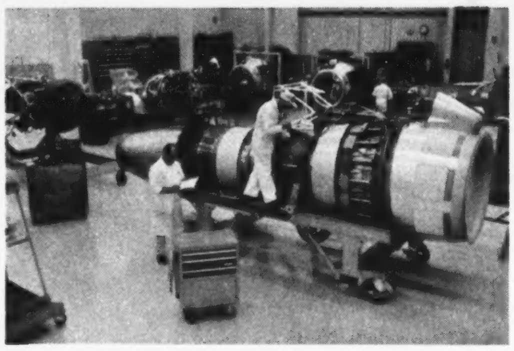
142. Bill:

. . . A FLIGHT INSTRUCTOR

143

143. Bill:

. . . AN AIR TRAFFIC CONTROLLER . . .



144

144. Bill:

. . . AN AVIATION MECHANIC . . .

145

145. Bill:

. . .OR A MEMBER OF AN AIRLINE FLIGHT CREW. . .

146. Bill:

. . .THE WORLD OF AVIATION IS ONE WHERE CAREER OPPORTUNITIES ARE BRIGHT IN THE YEARS AHEAD. NOW, WALTER, IT'S ALL YOURS AGAIN.

146

147. Walter:

THANKS BILL AND DENNIS AND LINDA AND ALL THE OTHER COMMITTEE MEMBERS WHO HAD A PART IN MAKING THIS REPORT. MR. RICHARDS, OUR VOCATIONAL COUNSELOR, HAS DETAILS ABOUT THESE JOBS, AND OTHERS WE DIDN'T MENTION. MR. RICHARDS, WOULD YOU LIKE TO ADD A WORD?

147

148. Mr. Richards:

YES, THANKS, WALTER. I'D LIKE TO EMPHASIZE THAT LEARNING POWER IS EARNING POWER. THE FARTHER YOU GO IN SCHOOL, THE GREATER ARE YOUR OPPORTUNITIES IN THE FUTURE. AVIATION OFFERS A WIDE VARIETY OF JOBS REQUIRING DIFFERENT LEVELS OF EDUCATION. OF COURSE, THE BEST JOBS GO TO THOSE WITH THE MOST EDUCATION, BUT IF YOU DON'T PLAN TO GO TO COLLEGE, DON'T BE DISCOURAGED.

148

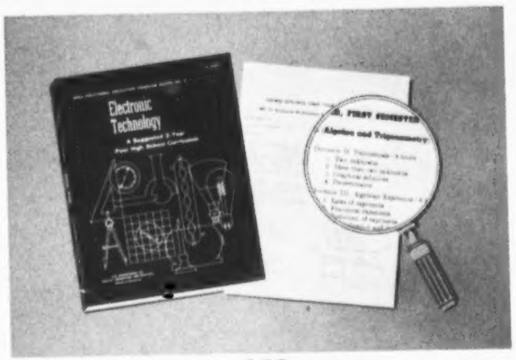
149. Mr. Richards:

YOU HAVE SEEN HOW SOMETIMES YOU CAN LEARN A JOB AS YOU EARN. BUT YOU CAN GET AN EARLY START ON A BETTER PAYING JOB BY PREPARING FOR TECHNICAL WORK OR A SKILLED TRADE AT A VOCATIONAL-TECHNICAL SCHOOL. FOR EXAMPLE, LOOK AT THE TYPICAL VOCATIONAL COURSES YOU CAN TAKE AFTER YOU FINISH HIGH SCHOOL.

149

150. Mr. Richards:

THESE ARE JUST A FEW EXAMPLES OF MATERIALS THAT HELP A YOUNG PERSON BUILD A CAREER. TALK IT OVER WITH YOUR PARENTS, AND REMEMBER, THERE ARE OTHER BOOKS AND PAMPHLETS IN THE GUIDANCE OFFICE TO HELP ANSWER YOUR QUESTIONS.



150

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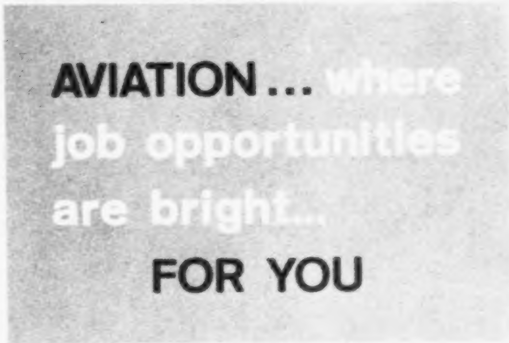
151. Mr. Richards:

AS FOR AVIATION–IT'S A YOUNG AND VIGOROUS INDUSTRY. IF YOU CHOOSE AN AVIATION CAREER AND PREPARE FOR IT TO THE BEST OF YOUR ABILITY, YOU'LL OPEN THE DOOR TO MANY OPPORTUNITIES TO GROW AND TO MAKE AN IMPORTANT CONTRIBUTION TO YOUR EXCITING WORLD OF TOMORROW.



AVIATION ... where
job opportunities
are bright...
FOR YOU

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152.

AVIATION–WHERE CAREER OPPORTUNITIES ARE BRIGHT–FOR YOU. FOR MORE INFORMATION, SEE YOUR VOCATIONAL COUNSELOR.

– The End –

SUPPORT
AEROSPACE EDUCATION

CHAPTER TWO

Aircraft Manufacturing Occupations

GENERAL INFORMATION

The aerospace industry (of which aircraft manufacturing is one portion) is primarily engaged in the design, development, and manufacture of aircraft, missiles, spacecraft, their propulsion, navigation and guidance systems, and other aeronautical and astronautical systems and their components. In 1967 sales by the aerospace industry totaled $27.3 billion, employment totaled 1,407,000—making the industry the nation's largest single manufacturing employer—and the payroll amounted to $12.9 billion. Occupational groups of the industry in 1967 were:

Scientists & Engineers	17.0 per cent
Technicians	7.0 per cent
Production Workers	54.1 per cent
Administrative & Support Activities Personnel ("White Collar" categories)	21.9 per cent

Now that an overall picture of the aerospace industry has been presented, this GUIDE will concentrate on the aviation portion of the industry—the aircraft manufacturing occupations. The major manufacturing divisions are airframe, components, accessory and equipment, and engine. Workers are grouped as follows: scientists and engineers, technicians, production workers, and administrative and support activities personnel.

Scientists and Engineers include all persons engaged in scientific or engineering work which requires a knowledge of or training equivalent at least to that acquired through completion of a four-year college course with a major in these areas. Scientific fields include aerodynamics, avionics, ceramics, chemistry, cryogenics, mathematics, meteorology, metallurgy, physics, physiology, and psychology. Engineering fields include aerodynamics, avionics, design, engineering reliability, equipment, field service, flight test, instrumentation, manufacturing, materials and processes, powerplant, propulsion and internal flow, sales, structures, and weights and balance. College degree fields in engineering include aeronautical, aerospace, ceramic, chemical, civil, electronic, electrical, engineering mechanics, engineering physics, industrial, mechanical, metallurgical, and nuclear.

Engineers outnumber scientists more than four to one in the aerospace industry. More than half of the industry's scientists and engineers are in research and development work. The remainder are in production planning, quality control, tool designing, technical purchasing, technical sales and service, technical writing and illustrating, and related fields. Typical technical areas of endeavor include: aircraft and flight equipment, chemical warfare equipment and materials, chemistry, communications, detection, electrical equipment, electronics and electronic equipment, fluid mechanics, fuels and combustion, ground transportation equipment, installations and construction, materials (non-metallic), mathematics, metallurgy, military sciences and operations, navigation, nuclear propulsion, ordnance, personnel and training, physics, propulsion systems, and research and research equipment.

AEROSPACE INDUSTRY EMPLOYMENT*

(Aviation and Space Occupations)

Type Employment	March 1967	June 1967	December 1967	March 1968	% of Total March 1968
Scientists and Engineers	234,000	235,000	240,000	241,000	17.1%
Technicians	94,000	95,000	96,000	96,000	06.8%
Production Workers	743,000	747,000	761,000	756,000	53.7%
Adm. & Support Activities Personnel ("White collar" categories)	310,000	313,000	310,000	316,000	22.4%
TOTAL	1,381,000	1,390,000	1,407,000	1,409,000	100.0%

*AIA Economic Data Branch estimates

Source of Data: Aerospace Industries Association of America, Inc.

Technicians include all persons engaged in work requiring knowledge of physical, life, engineering, and mathematical sciences comparable to knowledge acquired through technical institutes, junior college, or other formal post-high school training, or through equivalent on-the-job training or experience. (Craftsmen, such as machinists and electricians, are not included in this definition.) Science Technician and Engineering Technician fields include all those mentioned above for scientists and engineers, plus draftsmen and technical writers and illustrators. Examples of technician position titles are: Senior Documentation Analyst, Software Programmer, Contracts Administrator, Technical Illustrator, Technical Writer, Supervisor of Blueprint and Microfilm Files, Tool Designer, Training Equipment Designer, Draftsman, Research Mechanic, Research Electrician, Laboratory Technician, Electronics Technician, and Production Planner.

Production Workers include working foremen and all non-supervisory workers engaged in fabricating, processing, assembling, inspection, receiving, storage, handling, packing, warehousing, shipping, maintenance, repair, janitorial, and watchman services, product development, auxiliary production for a plant's own use, and record keeping and other services closely associated with the above operations. The chief categories of Plant Occupations are sheet-metal work, "other" metal work, machinery and tool fabrication, assembly and installation, inspecting and testing, (quality control), flight check-out, materials handling, maintenance, and protective and custodial. Typical jobs include the following:

Sheet-Metal Occupations

Sheet-metal Workers
Power Brake Operators
Power Hammer Operators
Power Shear Operators
Punch Press Operators
Profile Cutting Machine Operators

"Other" Metal-Processing Occupations

Tube Benders
Riveters
Welders
Foundry Workers: Patternmakers, Molders, & Coremakers
Forging Department: Drop Hammer Operators & others
Heat Treaters
Painters
Platers

Machining and Tool Fabrication Occupations

Milling Machine Operators
Production Machinists
Tooling Machinists
Machine Tool Operators
Jig and Fixture Builders
Tool and Die Makers
Engine Lathe Operators
Tooling Welders
Boring Machine Operators
Precision Honers

Assembly and Installation Occupations

Final Assemblers
Armament Assemblers
Power Plant Installers
Electronics Assemblers
Electrical Assemblers
Plumbing Assemblers
Hydraulic Assemblers
Heating and Ventilating Assemblers
Rigging and Controls Assemblers
Upholsterers

Inspecting and Testing Occupations (Quality Control)

Outside Production Inspector
Receiving Inspectors
Machined Parts Inspectors
Fabrication Inspectors
Assembly Inspectors
Tool Inspectors
Template Inspectors
Gauge Inspectors
Electrical Inspectors
Flight Line Inspectors

Flight Check-Out Occupations

Chief Mechanics or Crew Chiefs
Engine Mechanics
Electronics Mechanics

Materials Handling Occupations

Truck Drivers
Crane Operators
Shipping Clerks
Tool Crib Attendants

Maintenance Occupations

Maintenance Mechanics
Millwrights
Electricians
Carpenters

Plumbers
Painters
Welders

Protective and Custodial Occupations

Guards
Firemen
Janitors

"White Collar" Category includes all administrative and support activities personnel. These positions include executives responsible for direction and supervision of research and production; officials in departments such as sales, purchasing, personnel, accounting, public relations, advertising, and industrial relations; and secretaries, stenographers, typists, clerks, and tabulating machine operators.

Nature of the Work.

1. Scientists, Engineers, and Technicians. Almost every branch of science and engineering is involved in the solutions of the great variety of problems associated with the design and production of faster and more efficient aircraft and the in-flight operation and ground servicing of planes, their passengers, and cargo. Increasingly more complex mechanical and electrical equipment is necessary for our airlines. The challenge includes the search for aircraft with short takeoff and landing (V/STOL) capabilities and for the design of aircraft for specialized work use and for pleasure purposes. All the designs must stress improved safety factors.

These professional and semi-professional workers may be assigned to concentrate on tasks involving one of three major areas: (1) research, design, or development; (2) production, operation, or control; and (3) installation, maintenance, or sales engineering.

The emphasis is on thinking and on team work—a coordinated effort of Scientists, Engineers, and Technicians. The Scientists are chiefly concerned with basic and applied research; the search for scientific knowledge, new concepts, the extension of theory, and the practical applications of this knowledge and theory. The Engineers design equipment to test and put into practice the ideas or theories developed by scientific research. The Engineer normally has a definite goal in mind; his design is for a specific piece of equipment to do a specific task. Technicians work closely with the Scientists and Engineers and concentrate more on the practical aspects of using and testing equipment than on the theory involved in building it. Technicians usually begin as trainees or in the more routine positions under the direct supervision of an experienced technician, scientist, or engineer. More responsible assignments are undertaken as Technicians gain experience. The team is concerned with all phases of the development of their assigned project—from the initial planning and design to the final manufacture and testing.

2. Production Workers. A little more than half of all aircraft manufacturing workers are production workers ("blue collar" occupations). These workers fabricate, assemble, install, test, and inspect the many parts which make up a modern airplane. Other plant workers handle material and provide maintenance and custodial services. These occupations range from highly skilled to semi-skilled jobs.

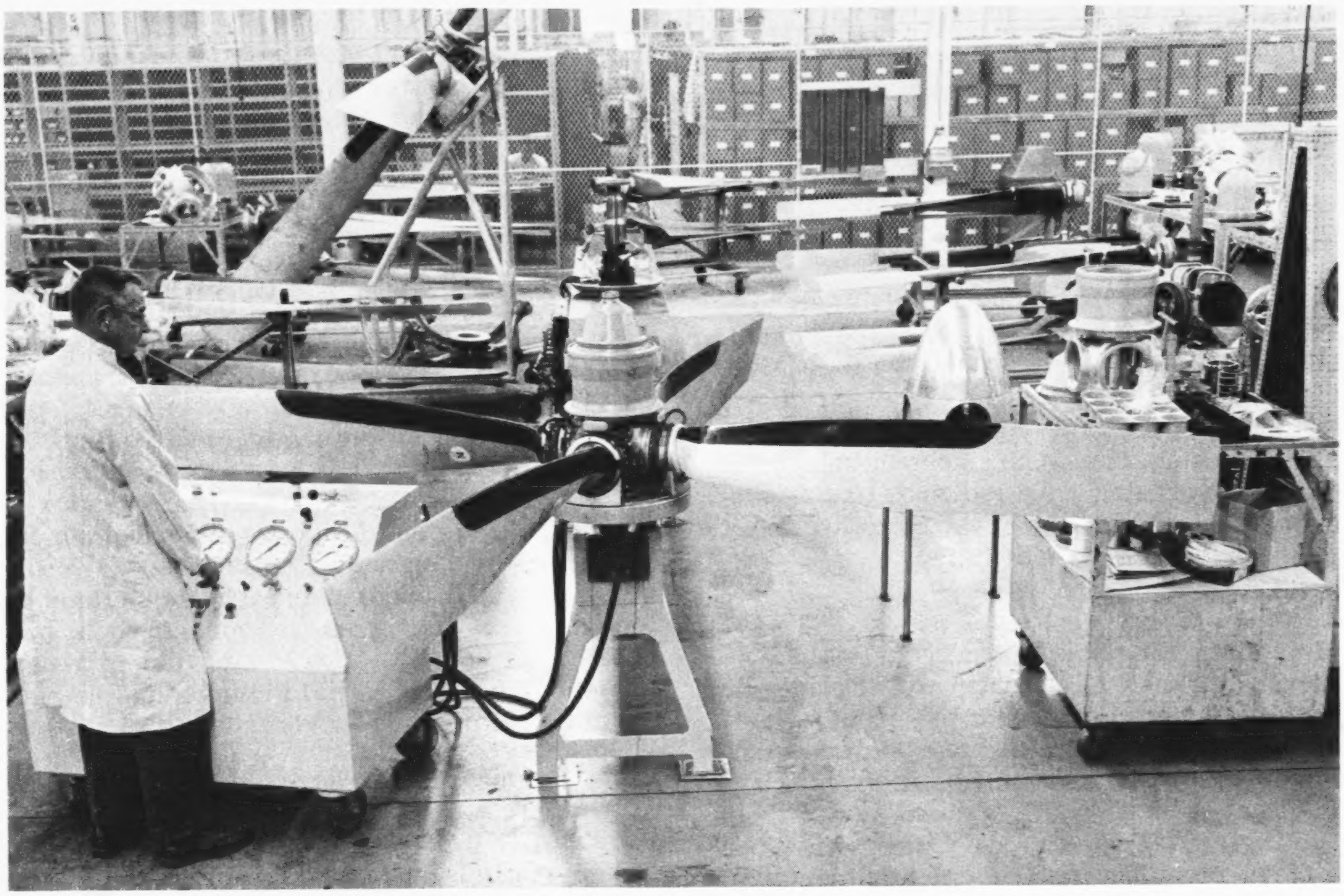
3. Administrative and Support Activities Personnel ("White Collar" Category). Managerial and administrative jobs are generally comparable with similar jobs in other industries. Personnel in these jobs include executives responsible for the direction and supervision of research and production, and officials in departments such as sales, purchasing, account-

AIRCRAFT INDUSTRY EMPLOYMENT*

March 1967—March 1968

Type Employment	March 1967	June 1967	December 1967	March 1968
Scientists & Engineers	119,000	121,000	123,000	123,000
Technicians	55,000	55,000	55,000	55,000
Production Workers	492,000	497,000	507,000	501,000
TOTAL	666,000	673,000	685,000	679,000

* AIA Economic Data Branch estimates
Source of Data: Aerospace Industries Association of America, Inc.



United Aircraft Corp. photo

Test Operator in Hamilton Standard's Overhaul and Repair Department Runs a Functional Test on a Propeller Assembly.

ing, public relations, advertising, and industrial relations. Many thousands of clerks, secretaries, stenographers, typists, tabulating machine operators, and other office personnel are employed also.

Working Conditions.

1. Scientists, Engineers, and Technicians work primarily indoors at a desk or in a research department, laboratory, or engineering department in a modern, clean, and temperature-controlled factory building. Some outdoor work may be necessary. The various departments are normally equipped with the latest electronic and mechanical instruments, laboratory apparatus, and drafting instruments.

2. Production Workers. Departments such as riveting, metal-processing, and welding are noisy areas of work and some jobs generate fumes and odors. Some employees, especially assemblers, work in hard-to-reach cramped spaces requiring much stooping, kneeling, crouching, and crawling to perform their tasks. Many operations, such as assembly, welding, molding, mechanic and machine shop jobs, require frequent lifting or carrying of heavy (up to 50 pounds) and medium (up to 25 pounds) loads. Although some hazards are associated with the aircraft industry, aviation plants are safe working places—with an injury-frequency rate averaging less than that for the manufacturing industry as a whole.

3. Administrative and Support Activities Personnel normally work in modern, clean, and temperature-controlled offices.

Where the Jobs Are. The largest aerospace labor markets are located in the following areas:

Los Angeles and Long Beach, California
Anaheim, Santa Ana, Garden Grove, California
New York, New York
Hartford, Connecticut
Philadelphia, Pennsylvania
St. Louis, Missouri
San Jose, California
Wichita, Kansas
Boston, Massachusetts
San Diego, California
Seattle, Washington
Atlanta, Georgia

As will be noted in the table below, most of the aircraft industry jobs are located in the New England and Middle Atlantic and the Pacific geographic areas.

Wages and Benefits. Salaries for employees in this industry are generally higher than those for similar work in most other industries. Wages do vary according to workers' skills and experience and they differ from plant to plant, depending upon the type of plant and the locality. The following fringe benefits are common in this industry and are comparable with those in other industries: two weeks of paid vacation after employment of one or two years, and three weeks, after ten or twelve years; six to eight paid holidays per year; one week of paid sick leave; insurance covering life, medical, surgical, hospital, and accident and health; and retirement pensions.

Near the top of the list of "Top-Paying U.S. Occupations" compiled by the U.S. Department of Labor and based on the 1960 Census are Aeronautical Engineers with annual median earnings of $9,018 and median schooling of 16.3 years. This study also indicated that 1.6 per cent of the Aeronautical Engineers were women.

Selected occupations from this study are as shown at the bottom of page 38.

1. Scientists and Engineers. Depending upon the demand for his specialty and on his individual abilities, the beginning salary of a Scientist may range from a present low of $616 (generally for a new graduate without any experience) to a high of $1,700 per month. The beginning salary for a newly-graduated Engineer may range from $694 to $728 per month. The College Placement Council has provided

PER CENT DISTRIBUTION OF EMPLOYMENT IN AIRCRAFT RESEARCH AND DEVELOPMENT AND PRODUCTION IN U. S. BY GEOGRAPHIC AREA*

March 1967 – March 1968

	MARCH 1967			MARCH 1968		
Geographic Area	**Scientists & Engineers**	**Technicians**	**Production Workers**	**Scientists & Engineers**	**Technicians**	**Production Workers**
New England & Middle Atlantic (CT, ME, MA, NH, NJ, NY, PA, RI, & VT)	30.0	32.7	21.0	28.4	30.6	21.6
East-West North Central (IL, IN, MI, OH, WI, IA, KS, MN, MO, NB, ND, & SD)	15.4	17.6	20.3	14.6	16.7	18.3
South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, & WV)	8.7	10.1	9.7	9.0	11.4	9.7
South Central & Mountain (AL, AR, KY, LA, MS, OK, TN, TX, AZ, CO, ID, MT, NV, NM, UT, & WY)	11.4	16.8	10.3	12.5	17.6	11.5
Pacific (AK, CA, HI, OR, & WA)	27.6	15.7	34.1	28.8	16.5	34.3
"Undistributed"	6.9	7.1	4.6	6.7	7.2	4.6
TOTAL U. S.	100.0	100.0	100.0	100.0	100.0	100.0

* To prevent disclosure of individual company data, no area with four or less establishments is shown separately.
Source of Data: Aerospace Industries Association of America, Inc.

figures showing the average monthly starting salaries paid to new college graduates, 1966-1967, by aerospace industry employers:

Major Area of Study	Average Monthly Starting Salary
Accounting	$660
Business & Management	620
Engineering—Aerospace	724
Engineering—Chemical	720
Engineering—Civil	711
Engineering—Electrical	728
Engineering—Industrial	694
Engineering—Mechanical	717
Engineering—Metallurgical	721
Humanities & Social Sciences	616
Marketing & Distribution	618
Physics, Chemistry, Mathematics	698

Scientists and Engineers are normally on the day shift. Attendance at seminars and meetings of professional societies is often paid by the company. Some companies also pay the membership dues to professional societies.

2. Science Technicians and Engineering Technicians. Technicians' salaries generally range from $475 to $600 per month at the beginning of their careers. The starting salary will depend upon the Technician's technical specialty and education, and upon his experience. After many years of experience the salary may increase up to $850 per month and go as high as $1,500 per month in a few cases. The Bureau of Labor Statistics reports that in 1964 annual salaries for high-level technicians in positions in private industry averaged $8,500 and approximately one-fourth of the workers had salaries above $9,200. Technicians are normally on the day shift.

3. Production Workers. Shift work—with three in operation—is normally required for Production Workers. An increase in salary of about 10 to 20 cents per hour is generally paid workers on the second and third shifts. The following table provides information about Production Workers' average hourly earnings and average

SELECTED TOP PAYING U.S. OCCUPATIONS

(Based on the 1960 Census)

Occupation	Annual Median Earnings	Median Schooling	Per Cent of Women
Airplane Pilots & Navigators	$10,274	13.5	.6
Physicists	9,043	17.2	4.2
Aeronautical Engineers	9,018	16.3	1.6
Chemical Engineers	8,810	16.7	.9
Sales Engineers	8,694	16.1	.3
Electrical Engineers	8,553	16.2	.8
Metallurgical Engineers and Metallurgists	8,534	16.3	1.0
Geologists & Geophysicists	8,409	16.9	2.3
Mechanical Engineers	8,355	16.1	.3
Engineers, Technical	8,062	16.0	.8
Mathematicians	7,780	17.1	26.5
Psychologists	7,726	17.5	31.1
Industrial Engineers	7,673	15.2	2.1
Civil Engineers	7,606	16.1	.6
Natural Scientists—Misc.	7,351	16.5	9.8
Statisticians & Actuaries	7,015	16.1	30.6
Pattern & Model Makers (except paper)	6,525	12.0	1.7
Toolmakers, Die Makers & Setters	6,503	11.7	.6
Professional, Technical, & Kindred Workers—Not elsewhere Classified	6,402	15.6	20.4
Biological Scientists	6,383	17.2	26.7

COMPILED BY U.S. DEPT. OF LABOR

Average Hours and Earnings for Production Workers

AIRCRAFT AND PARTS
(Annual Average)

	1960	1962	1964	1966	1967E
Average Weekly Hours	40.9	41.8	41.4	43.3	42.5
Average Weekly Overtime Hours	2.2	2.9	2.5	5.0	4.3
Average Hourly Earnings	$2.70	$2.87	$3.02	$3.30	$3.41
Average Weekly Earnings	$110.43	$119.97	$125.03	$142.89	$144.96

E - Estimated
Source of Data: Aerospace Industries Association of America, Inc.

weekly hours, overtime hours, and earnings (see above).

4. Administrative and Support Activities Personnel. Salaries are generally higher than those for similar work in most other industries. "White Collar" workers are normally on the day shift.

Opportunities for Advancement.

1. Scientists and Engineers. Advancement in salary levels is available, i.e., Senior Scientist or Senior Engineer; however, the chief advancement possibilities involve supervision and management and executive positions. The "team" or "project" concept in attacking various goals has increased the need for management talent and thus the opportunities for advancement for Scientists and Engineers.

2. Science Technicians and Engineering Technicians. With further education, a Technician can advance to a professional position. Technicians are also advanced by being assigned tasks normally performed by professionals and they may move into supervisory positions. Technicians who have a good working knowledge of the equipment produced by the company and who have good personalities may become company salesmen, technical representatives, or troubleshooters.

3. Production Workers. Traditionally, skilled workers may advance to positions requiring higher skills and experience such as foremen, inspectors, and supervisors. Educational opportunities are available to advance to semi-professional positions. A possible advancement program in engineering might be: from Assembler to Quality Control (Testing) to Engineering Technician to Junior Engineer and finally to Engineer. Union contracts normally require advancement of semi-skilled workers to be based upon seniority of qualified individuals. By participating in courses conducted by the company or by vocational or technical schools in the local community, semi-skilled workers may prepare themselves for a skilled job, such as blueprint reading, welding, or mechanic.

4. Administrative and Support Activities Personnel. Advancement in these areas is normally to similar positions with greater responsibilities and higher salaries.

Requirements to Enter the Job. In general terms, the aircraft manufacturing industry is seeking individuals with self-discipline, a willingness to accept responsibility, a sound foundation in technology, and a team spirit. There are many employment opportunities for women in this industry because women possess dexterity and the ability to perform a repetitious job. In one aircraft plant, women fill 70 different job classifications and comprise 16 per cent of the total number of employees.

1. Scientists and Engineers. A college degree in one of the sciences or in engineering is the minimum requirement for scientific or engineering jobs. A few individuals with years of semi-professional experience and some college or college-equivalent training may be hired as professionals, but this is now so rare that perhaps it should not even be mentioned. An

Technical Illustrators Make Drawings to Illustrate Aircraft Maintenance Manuals.

interdisciplinary approach is being used increasingly and this requires better training in, for example, the interrelated functions of mathematics, physics, and chemistry. A solid foundation in the fundamental concepts and basic general areas of science and engineering is recommended. There is a need for constant study to keep up with the technical fields—a need to constantly readjust to the rapidly changing technology. Professionals with advanced degrees are common in this industry.

2. Science Technicians and Engineering Technicians. Much of what has been mentioned above for Scientists and Engineers applies to Technicians. An Associate in Science Degree, or Associate in Engineering Degree, or a diploma from a College or University, Junior or Community College, Technical Institute, or technical or vocational school is normally required. (Technical Institutes offer training designed to qualify the graduate for a specific job or cluster of jobs immediately upon graduation, and with a minimum of on-the-job training.) One may also become qualified for some technician jobs by completing an on-the-job training program, through work experience and part-time, formal, post-secondary school level courses, or through training and experience obtained while on active duty with the military services.

3. Production Workers. Training requirements for plant jobs vary from a few days of on-the-job instruction for semi-skilled workers such as material handlers and guards, to several years of formal apprenticeship for craftsmen, such as machinists, tool and die makers, aircraft mechanics, sheet-metal workers, patternmakers, and electricians. Many levels of skill are required for many plant jobs. Workers with little or no previous training or experience may be hired for the less skilled assembly jobs. Skilled assemblers may need two to four years of plant experience, plus a high school or vocational or technical school education, or the equivalent. Generally speaking, starting workers with little experience serve as helpers or assistants and develop their skills on the job and through plant training courses. An individual may increase his chances of being hired by acquiring a skill through vocational or technical school attendance.

4. Administrative and Support Activities Personnel. The requirements for employment of managerial and administrative personnel are generally comparable with similar jobs in other industries. Employability can be enhanced by acquiring a knowledge of engineering, technology, and the aviation industry because of the nature of the aircraft manufacturing industry as it relates to research and development, and production.

Opportunities for Training. Because workers who are highly trained and are aware of new developments are needed in the industry, the majority of aircraft plants support some kind of formal worker training program. Most of the plants conduct training classes themselves, others pay tuition and related costs for outside courses taken by their employees at vocational or technical or adult education programs offered by the local community, and some plants do both. Some classes are held during working hours, with the trainee being paid for class time. Other classes are held after working hours. Courses are available for practically every occupational group and cover many skills and areas of knowledge.

Many aircraft plants provide their employees with financial aid for college enrollment. This aid is furnished either as direct grants or in the form of scholarships and it is possible for an employee to work and to continue his education at the same time. These opportunities help workers advance more rapidly to higher skills and to better paid jobs.

The farther one goes in school, the greater are the opportunities for employment. The best jobs go to those with the most education. At least a high school education is practically mandatory for any worker in the aircraft industry.

Post-secondary school training is vitally important, and such training may be obtained from: area vocational-technical schools, technical institutes, junior or community colleges, or four-year colleges or universities.

Outlook for the Future. The Aerospace Industries Association, spokesman for the industry, indicated that the primary source of increased aerospace employment in 1968 will be in civilian aircraft programs—jet transports, helicopters, and general aviation aircraft. Sales of these aircraft plus engines and parts will increase by 34 per cent from $4.9 billion in 1967 to $6.6 billion in 1968. One marketing specialist recently completed a study which indicated that nearly 240,000 aircraft worth $96.6 billion will be built by 1977, compared with 131,336 planes worth $56.7 billion built in the past decade.

Employment on production and research and development of commercial and military aircraft is anticipated to rise from 816,000 in March 1967 to 838,000 in March 1968, a 2.7 per cent increase.

Employment by military aircraft manufacturers probably will remain stable during the period.

Employment in plants producing primarily commercial transport aircraft is anticipated to increase from 121,762 in March 1967 to 135,040 in March 1968, an 11 per cent increase. This area of aviation activity has been one of substantial growth with a gain in employment from 103,404 in June 1966 to 131,432 in June 1967, a 27 per cent increase.

General aviation employment is also expected to increase from 30,397 to 31,758 during this period. Rising demand for general aviation business jets as well as propeller-driven aircraft is expected by these firms to lead to increases in present levels of production in 1968, surpassing records achieved in 1966. Increasing numbers of student pilots, growing business utilization, pleasure flying, and technological innovation has characterized this area.

Employment in helicopter plants producing both military and commercial aircraft is anticipated to decline by five per cent in the period. Helicopter employment is expected to decline from 35,942 in June 1967 to 33,560 by March 1968. This decrease is primarily due to some easing in military demand for accelerated production. Employment in these plants will still be higher than in March 1966.

1. Scientists and Engineers. The Bureau of Labor Statistics indicated a projected demand for 25,000 new scientists and 81,000 engineers each year during the 1960's.

Approximately one million engineers were employed in the United States in early 1967; by 1975 the requirement may total 1.5 million. Women engineers totaled about 8,000 in 1966, so women have a challenging opportunity to enter this field of endeavor.

The Engineering Manpower Commission recently stated that "there is a strong present and future demand for mechanical, electrical, and aerospace graduates, with a high degree of interchangeability between curricula permissible." In 1964 the Commission estimated the need for 45,000 new bachelor's degree engineers per year; their current estimate is for 69,000 per year to 1976. (In 1963 the National Science Foundation predicted the need

Fairchild Hiller Corp.—Gene Wirtz photo

Engineering Technicians Prepare Model Aircraft for Wind Tunnel Tests.

for 71,000 new engineers per year.)

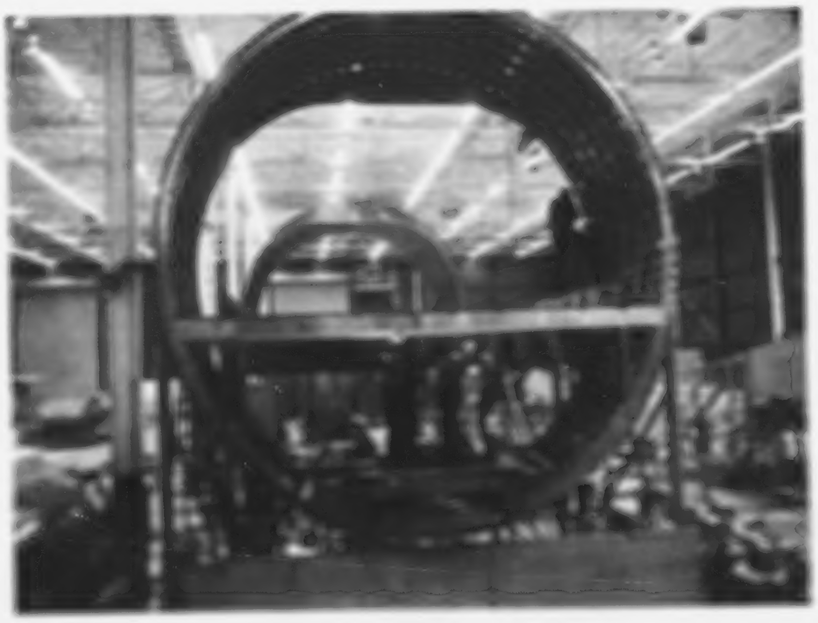
The aerospace industry has estimated an increase in the employment of engineers of 61 per cent between 1965 and 1976.

The demand for engineers is increasing while the supply is decreasing. For example, out of about 50,900 new engineering degrees in 1966, only 34,800 (or 68%) individuals were seeking jobs. One reason for this is the increasing number of engineer-graduates who are continuing in school to earn advanced degrees. This manpower gap of demand vs. supply of new engineers is expected to widen—at least through 1976.

2. Science Technicians and Engineering Technicians. The Bureau of Labor Statistics estimates a demand for 25,000 science technicians and 81,000 engineering technicians each year during the 1960's. The increasing demand and decreasing supply of scientists and engineers augers well for the technicians. One way to alleviate such shortages is to assign certain duties now performed by the professionals to technicians. One estimate places a need for three or four technicians working in support of each scientist and each engineer. At the present time, one technician is employed for every 2.2 scientist and engineer in the Aircraft Industry. Employment opportunities for technicians are certainly favorable, especially for draftsmen, electronics technicians, mathematics aides, and research technicians.

3. Production Workers. The increased industry activity mentioned above can be translated directly into an increased number of production jobs, especially skilled jobs. Employment opportunities are bright for skilled workers, such as skilled assemblers and inspectors, tool and die makers, and maintenance craftsmen. The semi-skilled– and certainly the worker without a skill—will find it increasingly difficult to obtain employment.

4. Administrative and Support Activities Personnel. Employment of managers and administrators is expected to increase slightly because more of these workers will be needed to direct and coordinate the expanding research and development programs. Clerical workers, as a group, are expected to decline slightly as more office automation takes place; however, more secretaries, stenographers, and typists will be needed to handle the secretarial needs of the growing numbers of managers, administrators, engineers, and scientists.



WHERE TO OBTAIN FURTHER INFORMATON - about aircraft manufacturing occupations. (Be sure to be as specific as possible when making each request.)

Aerospace Industries Association of America, Inc 1725 DeSales St., N.W. Washington, D.C. 20036	For general information.
American Association of Junior Colleges 1777 Massachusetts Ave., N.W. Washington, D.C. 20036	For general information.
American Federation of Technical Engineers 900 F Street, N.W. Washington, D.C. 20004	For general information.
American Institute of Aeronautics and Astronautics 1290 Sixth Ave. New York, New York 10019	Your Career as an Aero/Space Engineer. Free booklet.
American Society for Engineering Education, Technical Institute Council 1346 Connecticut Ave., N.W. Washington, D.C. 20036	Engineering Education. November 1966 issue. $1.25.
Amercan Society of Certified Engineering Technicians 2029 K St., N.W. Washington, D.C. 20006	For general information.
Careers Box 135 Largo, Florida 33540	Career summaries: Engineer, Ceramic, No. 22S. Engineer, Chemical, No. 136S. Draftsman, Aeronautical No. 288S. Technician, Aeronautical Engineering, No. 125S. Assemblyman, Aircraft. No. 173S. 15¢ each.
Chronicle Guidance Publications, Inc. Moravia, New York 13118	Occupational briefs: Aeronautical Engineers, No. 159. Mathematical Technician, No. 421. Aircraft Manufacturing Industry, No. 381. 35¢ each.
Electronics Industries Association 1721 DeSales St., N.W. Washington, D.C. 20036	For general information.
Engineers' Council for Professional Development 345 East 47th Street New York, New York 10017	After High School What? 3¢. Curricula Leading to First Degrees in Engineering Technology in the United States. 25¢.
Engineers Joint Council 345 East 47th Street New York, New York 10017	For general information.

International Association of Machinists and Aerospace Workers 1300 Connecticut Ave., N.W. Washington, D.C. 20036	For general information.
International Union of Electrical, Radio, and Machine Workers 1126 - 16th Street, N.W. Washington, D.C. 20036	For general information.
National Council of Technical Schools 1507 M Street, N.W. Washington, D.C. 20005	Career monographs: The Aeronautical Engineering Technician, Drafting Technology, The Electronic Engineering Technician. 5¢ each. Engineering Technology Careers. Booklet. 50¢.
National Society of Professional Engineers 2029 K Street, N.W. Washington, D.C. 20006	Engineering—A Career of Opportunity. Free leaflet.
Society of Aerospace Material and Process Engineers Box 613 Azusa, California 91703	For general information.
Society of Women Engineers 345 East 47th St. New York, New York 10017	For general information.
Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402	Employment Outlook for Engineers: Aerospace, Agricultural, Ceramic, Chemical, Civil, Electrical, Industrial, Mechanical, Metallurgical, Mining. No. L2.3: 1450-32. 10¢. Employment Outlook in Mathematics and Related Fields: Mathematicians, Statisticians, Actuaries. No. L2.3: 1450-47. 10¢.
U.S. Department of Health, Education and Welfare Office of Education Division of Vocational and Technical Education Washington, D.C. 20202	For general information.
Your state department of education	For general information.
Your state employment service	For general information.

SUPPORT AEROSPACE EDUCATION

CHAPTER THREE

Career Pilots and Flight Engineers

GENERAL INFORMATION

While the various kinds of piloting jobs involve a variety of special circumstances, there are also a number of conditions that are common to all career pilots:

1. All pilots have progressed through a flight training period in which they have earned a commercial pilot's license. Most likely they have one or more advanced ratings (such as instrument or multi-engine ratings) depending upon the requirements of their particular flying jobs.

2. They all work in a cockpit crowded with instruments, switches, and dials. Noise and vibration, particularly noticeable on propeller aircraft, are always present. They operate the aircraft controls to taxi, takeoff, cruise, and land.

3. They have a concern for safety including the safe condition or airworthiness of the plane; weather factors affecting the safety of the flight; and flight regulations, air traffic control procedures, and air navigational aids designed to provide maximum safety in the air.

4. They have a dual responsibility. They must not only satisfy their employer, who might be an air taxi operator or an airline, but they must also convince the Federal Aviation Administration that their flying skills, knowledge, and state of health are at all times acceptable for the particular flying jobs they perform.

5. They must submit to frequent physical examinations and meet certain medical standards which vary according to the license which the pilot holds. A Class I Medical Certificate requires the highest standards for vision, hearing, equilibrium, and general physical condition. The pilot must have an exceptionally good health history with no evidence of organic and nervous diseases or mental disorders. A Class II Medical Certificate demands less rigid standards but still requires a high degree of physical health and an excellent medical history. A Class III Medical Certificate has the lowest degrees of physical requirements. All three classes of medical certificates allow the pilot to wear glasses provided the correction is within the prescribed limits of vision. Drug addiction of any kind and chronic alcoholism disqualify any applicant.

The higher the number of flying hours and the more versatile the flying skills, the more varied are the opportunities for advancement as a pilot. There are many chances to transfer from one kind of pilot job to another as flying hours are accumulated and additional skills are mastered. Frequently a pilot doubles as a flight instructor and air taxi pilot, or he may also operate an aircraft repair station with flight instruction and air taxi operations as sidelines. Many good aviation and airline flight crew jobs qualify pilots for jobs with governmental agencies, such as the Federal Aviation Administration (FAA).

Information concerning specific pilot careers is contained in the paragraphs below. Additional data for all Career Pilots pertaining to "Opportunities for Training" and "Where to Obtain Further Information" are included at the end of this chapter.

REQUIREMENTS

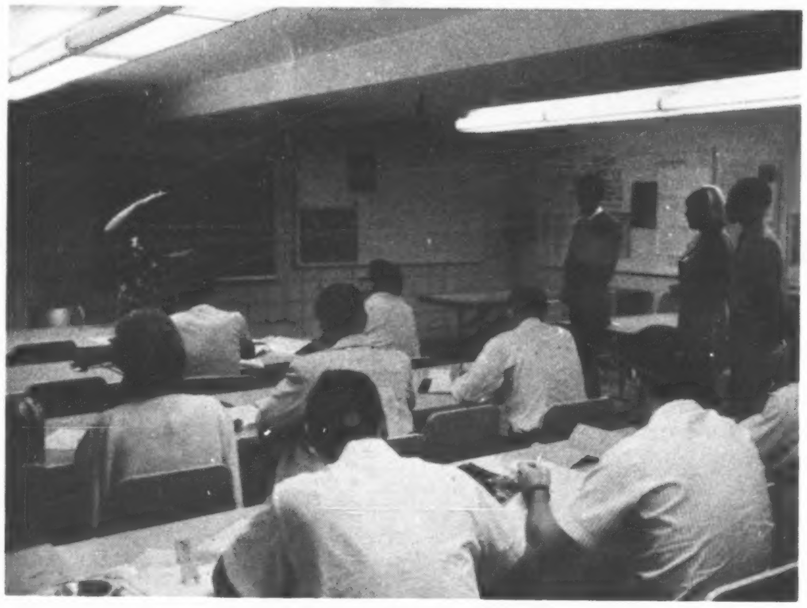
Type of Pilot	Education	Licenses and Ratings	Hrs. Flying Experience	Physical Exam
Flight Instructor	No mandatory level. At least high school normally necessary to absorb instruction.	Commercial, flight instructor's rating, instrument rating	Minimum of 200 hrs.	Class II
Corporate Pilot	Ditto	Com'l. or Air Transport Rating (ATR) for heavy aircraft and jets. Multi-engine and instrument rtgs. A&P mechanics license for corporate co-pilot	1,500 hrs. 500 hrs. required for Corporate co-pilot	Class II
Air Taxi or Charter Pilot	Ditto	Com'l., instrument rtg.	1,000 to 2,000 hrs.	Class II
Commercial pilot (patrol, ferry pilot, helicopter, aerial survey, photography, advertising, sightseeing, ambulance, etc.)	Ditto	Com'l., helicopter (some). Instrument rtg., seaplane rtg. (some) A&P mechanic (some)	Varied	Class II
Agricultural pilot	Ditto	Com'l.	500 hrs. accident-free, precision, low-level flying experience. Completion of specialized flight training in agricultural applications is preferred.	Class II
Test pilots: Experimental or Engineering Test Pilot Production Test Pilot Airline Test Pilot	Engineering degree-preferably aeronautical engineering	Com'l. Instrument rtg.	500-2,000 hrs. Airline test pilot: 3,000-5,000 hrs. flying as a line pilot. In all cases, some experience as a military flight test pilot is preferred.	Class I
Airline Pilot (Captain)	College preferred	ATR and instrument rtg.	*	Class I with 20/20 vision as corrected. 19-35 yrs. of age 5'6" to 6'4"
Airline Co-pilot (1st officer)	College preferred	Com'l. Instr. rtg. ATR preferred	*	Class II (Class I preferred)
Airline Flight engineer (or 2nd officer)	High School—or 2 yrs. college preferred	Com'l. Instr. rtg., A&P mechanic Flight Engineers rtg.	1,000 hrs.	Class II (Class I preferred)
Airline flight instructor	College preferred	ATR and Flight Engineer's rtg.	2,500 airline flight hours	Class I

* No starting figures are given, as first officers move up to captaincies as vacancies occur.

WAGES AND BENEFITS

Typical Annual Basic Wages			Typical
Starting	Maximum	Additional Wages and Remarks	Benefits and Privileges
$5,720	$7,800	Some receive base pay plus hourly rate for flight time, or commission when students advance to new ratings. Salary varies with single-engine or multi-engine aircraft.	
$4,800 to 8,400	$12,900 to 24,000	Salary depends on experience and type of aircraft flown. Lowest salaries are for pilots of single-engine planes; highest salaries, for pilots of twin-jet and 4-engine turboprops.	Most companies have retirement plans, stock options, and paid vacations.
$7,200	$15,000	May also earn extra pay for hours flown above a minimum; or a commission on extra business the pilot produces above a specified minimum gross company income.	
$6,000	$18,000		
$6,000	$15,000	Some pilots receive 25-40% of the gross receipts they produce. As work is seasonal, they may earn wages in off-season from other commercial flying jobs that make their total annual income as much as $20,000.	
$7,800	$19,200	Some receive an additional $20-$60 an hour hazard pay during test flights.	Insurance paid by company plus other benefits given to aircraft mfg. or airline employees in general (paid vacation and sick leave, etc.)
*	$36,000**	Salary varies with type of airplane, day and night trips, international or domestic routes, passenger or cargo plane.	Paid vacation, insurance-retirement plan, travel priv., sick lv., group health insurance. Choice of routes and base depending on seniority.
$6,000	$24,000	Ditto	Ditto
$6,000	$21,600	Ditto	Ditto
$ 7,200	$24,000	Salary varies with size of the airline	Paid vacation, insurance-retirement plan, travel privileges, sick lv., group health insurance

** Based on present pilot contracts, captains of future aircraft flying 85 hrs. a month on foreign routes on half day-half night schedules may earn top salaries as follows: DC-8 stretched jet $42,500; Boeing 747—$46,000; Supersonic Transport $73,500.



Flight Instructor conducts ground school class.

FLIGHT INSTRUCTOR

Nature of the Work. The Flight Instructor teaches beginning students to fly. Explains principles of flight, aerial navigation, weather factors, and flying regulations in ground school classes. Demonstrates operation of aircraft and equipment in dual-controlled planes. Observes solo flights, and determines students' readiness to take examinations for licensed ratings. Also assists advanced students to acquire commercial, instrument, multi-engine, and air transport ratings.

Working Conditions. Hours of work are erratic as they depend on students' available time and the weather. He may work as many as 80 hours a week during the summer and can expect to work every weekend having good flying weather anytime during the year. His ground school classes may be scheduled during evening hours, indoors on airport premises. His flight instruction duties rarely take him far from home base. When not teaching, he may supplement his income as an air taxi pilot or by operating an aircraft repair station as a fixed base operator.

Where the Jobs Are. The 12,000 men and women who are actively employed as full time or part time flight instructors usually are based at airports having general aviation aircraft repair stations or an air taxi service, and the operator provides flight instruction as an additional source of income. Flight instructors in areas with major airports having heavy air traffic usually operate out of the smaller airports in the community so beginning students can avoid heavy air traffic patterns.

Opportunities for Advancement. The job of flight instructor often is considered a stepping stone to higher paying pilot jobs. Flight instructors can build up rather quickly the necessary high numbers of hours of flight experience to qualify them for jobs as corporate pilots or co-pilots, or for the position of air transport co-pilot. Many instructors prefer to remain in the teaching field, and if they have attained certain high standards they can qualify for the Federal Aviation Administration's "Gold Seal" which identifies them as superior teachers and can lead to higher salaries. When the number of students is large enough, a flight instructor might organize a flying school, directing the activities of a number of instructors. Jobs with the FAA as a Federal Operations Inspector is one of several FAA jobs open to pilots with flight instructor experience.

Outlook for the Future. General aviation is experiencing a literal explosion in the number of people who want to learn to fly. Some of this growth has been generated by the aircraft manufacturers who wish to develop potential customers. But much of it has resulted from the acceptance by business as to the value of aircraft as a tool, and by the public as to its value as a means of personal transportation and recreation. All this activity has created a demand for flight instructors. One established flight school, for example, recorded 4,700 hours of flight training in 1963. By 1965 this had jumped to 13,000 hours, and the school expects to more than double this figure in 1968. A conservative estimate of at least 95,000 to 120,000 new students begin flying lessons each year. In addition, there is a constant demand by pilots to upgrade their skills and acquire advanced licenses and ratings. All this is reflected in a 62 per cent increase in general aviation instructional aircraft hours from 1965 to 1966. A recent estimate points to a minimum requirement for more than 20,000 new flight instructors by 1975 and an additional 44,000 flight instruction jobs resulting from normal attrition within that period. The key position in the growth of aviation —the growth in numbers of various pilot categories and ratings—is predicated on the availability of an adequate number of flight instructors.

CORPORATE PILOT

Nature of the Work. The Corporate Pilot flies aircraft owned by business and industrial firms, transporting company executives on cross-country flights to branch plants and business conferences. May arrange for in-flight passenger meals and ground transportation at destinations, and is responsible for supervising the servicing and maintenance of the aircraft, and keeping aircraft records.

Working Conditions. Job is often demanding, but challenging, as the pilot is expected to fly in all kinds of flyable weather into many unfamiliar airports. The aircraft he flies may be a light twin-engine plane, a small executive jet, or even an airline type, such as an Electra turboprop. He is at the call of company executives so he is subject to irregular hours. Often he may be away from home overnight. (Studies show that a significant percentage of round trips are over 1,000 miles.) If his company owns a fleet of planes he may fly on a regular schedule. If he flies aircraft weighing more than 12,500 pounds, he is usually assisted by a co-pilot. Compared with the airline pilot, his flying assignments are far from routine.

Opportunities for Advancement. A corporate pilot can acquire enough flight experience and skill on the job to qualify as an airline co-pilot. If he prefers to remain in general aviation and his firm has a fleet of aircraft, he may eventually move up to the position of Chief Pilot, directing all the aircraft operations of his firm. Positions with the FAA, such as General Aviation Operations Inspector, are also available for the person with corporate pilot experience.

Outlook for the Future. Studies of the growth of the business aircraft fleet indicate an accelerating interest in corporations owning aircraft in the years ahead. The advantages offered to business executives in time saving, privacy, and flexibility of schedules, plus improved aircraft especially designed for business use are two important factors in the prediction that by 1975 there will be 32,150 company-owned planes —a 52 per cent increase over 1964. To operate this expanding fleet will require 1,200 new pilots each year not including additional pilots to replace those who retire, transfer, or who are removed for other reasons—or 3,300 by 1980. Companies are expected to be in competition with the airlines in the hiring of qualified pilots, most of whom will be instrument rated.

AIR TAXI OR CHARTER PILOT

Nature of the Work. The Air Taxi or Charter Pilot flies fare-paying passengers "anywhere—anytime", but usually for short trips over varying routes in single-engine or light twin-engine planes.

Working Conditions. Flies passengers and cargo as service demands, but normally in daylight hours if he pilots a single-engine plane. Flights are mostly of short duration and the pilot can count on returning home at the end of the working day. If he works for a company with a fleet of aircraft, he may fly on regular schedules over the same routes, much like a small airline. He may be required to wear a uniform when on duty.

Where the Jobs Are. Air taxi operators are located at major airports and at other airports where sufficient passenger traffic can be generated. Interline agreements with airlines account for substantial part of air taxi business so operators are usually located at airports having airline service.

Opportunities for Advancement. As is the case with the flight instructor, the air taxi pilot can build up enough flight experience in a relatively short time to qualify for the position of corporate pilot or air transport co-pilot. If he elects to remain in the air taxi and charter business, he may generate enough business to offer "commuter airline service" or scheduled service over specified routes similar to the operation of a small airline.

Outlook for the Future. Air taxi operators, who fly about 5,200 aircraft, claim the fastest rate of growth among all segments of general aviation. In 1967 just the 248 air taxi companies

Cessna Aircraft photo

Charter pilot makes an on-the-spot pickup.

who are members of the National Air Taxi Conference carried more than 553,000 passengers—a 69 per cent increase over 1966. Many additional thousand passengers were flown by hundreds of other air taxi operators. By 1970, air taxis expect to serve five million passengers. This growth reflects the increase in airline travel and the increased use of air taxis to "fly all the way"—from any of the more than 500 airports served by the airlines to the remaining 9,500 airports in communities without airline service. More than 20 airlines have agreements with air taxi companies to promote the use of air taxi service to airports not served by the airline and to issue through tickets. It also reflects a growing desire by the air traveler to by-pass crowded metropolitan streets and use air taxis to reach destinations in outlying areas rather than rented cars. Scheduled air taxi service is expanding rapidly. A study made in 1966 revealed that in less than two years the number of scheduled air taxi operators grew from 12 to 78. Today that number is close to 120. An expected expansion of the U.S. Post Office Department's present practice of contracting with air taxi operators to deliver mail will further increase scheduled air taxi business. If the present rate of growth continues in this field, more than 17,000 air taxi pilot jobs will become available by 1977.

COMMERCIAL AIRPLANE OR HELICOPTER PILOT

Nature of the Work. The Commercial Airplane or Helicopter Pilot performs a variety of flying jobs. If he pilots a fixed-wing plane, he may engage in such flying jobs as aerial photography, aerial advertising, sightseeing, geological survey, fish and game census, highway patrol, or checking federal airways and navigational aids. If he flies a helicopter, he may fly on a regular schedule carrying workers and supplies to off-shore oil rigs, or fly accident victims to a hospital heliport, lift heavy loads to tops of buildings or to remote mountain sites, rescue people stranded by floods, carry smokejumpers to fight forest fires, or deliver Santa Claus to shopping center parking lots.

Working Conditions. Flights are usually of short duration. The pilot usually works for an operator whose services are chartered. Helicopter pilots are often required to do precision flying hovering over a particular spot or landing on small cleared areas.

Fairchild-Hiller Corp.—Wick photo

Where the Jobs Are. As the use of general aviation aircraft and helicopters is so varied and widespread in the U.S., pilots are employed just about everywhere there are airports.

Opportunities for Advancement. These pilots can aspire to advanced status as they build up hours of flying experience and skills. If they work for an operator who owns a fleet of aircraft or helicopters, they may advance to the job of Chief Pilot, or they may build up enough business to employ other pilots and direct their operations.

Outlook for the Future. General aviation employed about 48,760 commercial pilots in 1965; 182,000 pilots with commercial licenses will be required by the end of 1980. These figures do not include pilots flying personal aircraft.

PATROL PILOT

Nature of the Work. The Patrol Pilot flies cross-country at low altitudes along pipelines or power lines, checking for signs of damage, vandalism, and other conditions requiring repairs. Radios to headquarters the location and nature of repair jobs.

Working Conditions. Flies light aircraft over all kinds of terrain, frequently at tree-top level.

Usually works for an operator who contracts with an oil pipeline or electric power company to furnish aerial patrol service.

Where the Jobs Are. Patrol pilots fly whereever electrical power transmission lines or oil and gas pipelines exist. Many power transmission lines run through mountainous regions where water sources and dams produce electrical power. Oil and gas pipelines spread out in underground networks from oil and gas fields, many of which are located in midwestern and southern states.

FERRY PILOT

Nature of the Work. The Ferry Pilot flies new aircraft from the manufacturing plant to dealers' showrooms and to private customers' home airports.

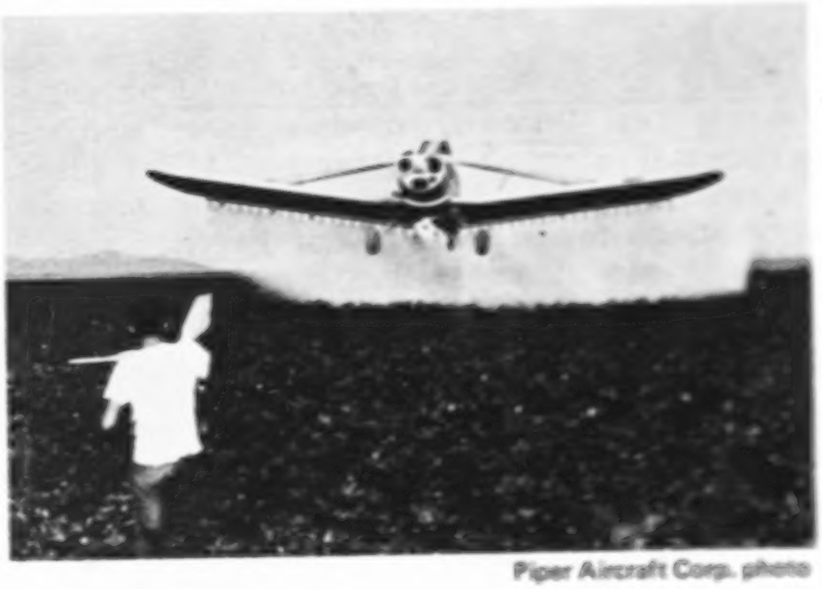
Working Conditions. After delivering new aircraft to customers and dealers, he returns to his home base on a commercial airliner or by other forms of transportation. He may be away from home overnight, depending on the distance required by the ferry flight. Ferry flights may require flying to foreign countries, giving the ferry pilot many interesting and challenging experiences enroute.

Where the Jobs Are. Operates out of cities having light aircraft manufacturing plants, most of which are concentrated in Kansas, Oklahoma, Florida, and Pennsylvania.

Outlook for the Future. The production of light aircraft is expected to increase annually from 15,700 planes in 1966 to 35,000 in 1975. This expected growth in production will require a proportionate increase in ferry pilots to affect prompt delivery of aircraft to customers.

AGRICULTURAL PILOT OR AERIAL APPLICATOR

Nature of the Work. The agricultural pilot flies specially-designed aircraft (including helicopters) to dust or spray herbicides, insecticides, seeds and fertilizers on crops, orchards, forests, fields, and swamps. Also may make aerial surveys of cattle and crops or fight forest fires by dumping fire retardant materials.

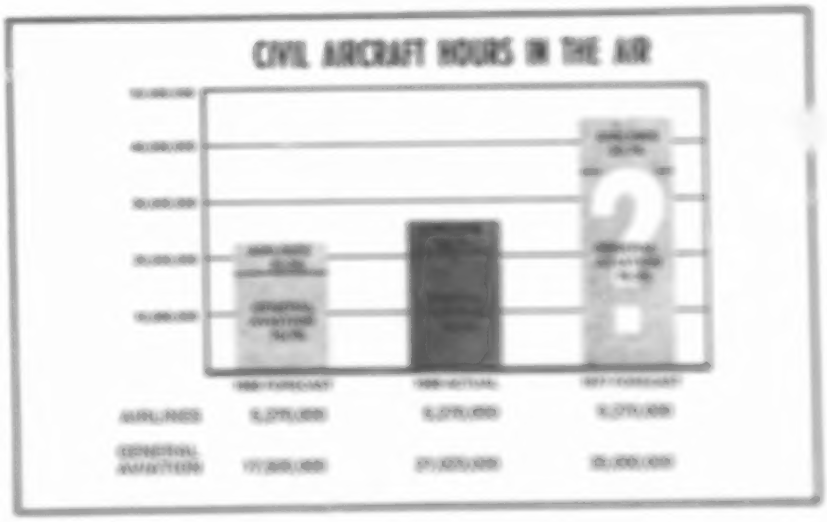


Piper Aircraft Corp. photo

Working Conditions. Flies at low level with heavy loads, in a regular pattern over the ground, avoiding trees, power lines, fences, and other obstacles. Most flying is done during the early hours of the morning and again in early evening when the air is still. Takeoffs are often made from country roads and open fields close to the area to be treated. Work is seasonal, ranging from six to nine months in southern areas to two months in northern sections. Usually works for an operator that furnishes aircraft, trained ground crews, and specialists who decide how the land is to be treated. Works very close to poisonous liquids and chemicals and must wear protective clothing and masks.

Where the Jobs Are. Agricultural pilots are in demand mostly in California and in the southern tier of states where the crop growing season is at its longest. Many pilots follow the crops north as the season progresses, while others find work in northeastern and western states with extensive forest areas.

Outlook for the Future. About 5,000 U. S. agricultural aircraft logged 1,038,570 flight hours in 1967 seeding, sowing, dusting, or spraying one acre out of every six under cultivation. One study forecasts the need for an additional 6,000 agricultural pilots by 1975.



TEST PILOT

Nature of the Work. Experimental or Engineering Test Pilots fly newly designed and experimental aircraft to determine if the plane operates according to design standards and make suggestions for improvements. Production test pilots fly new planes as they come off assembly lines to make sure they are airworthy and ready to turn over to customers. Airline test pilots flight test airliners after major overhauls before the planes are put back into service. They also flight test new aircraft to be sure they are up to airline standards before the airline accepts them from the manufacturer. Test pilots for the Federal Aviation Administration (FAA) fly FAA planes with experimental equipment aboard to test performance of the equipment, or they fly FAA planes to test new kinds of ground based navigational aids such as radar or runway lighting.

Working Conditions. The experimental test pilot expects the unexpected as he tests a plane to the limits of its design strength and performance capabilities. His job involves the most flying hazards. The production test pilot tests a plane on the basis of expected performance and known standards, as does the airline test pilot. All these pilots sometimes encounter emergency situations which they are expected to handle with the skill and knowledge their job requires. They prepare written and oral reports on their flight experiences and may fly either during day or night, depending upon the requirements of the test flight. Airline test pilots often work at night or on weekends, as most aircraft are serviced at that time.

Where the Jobs Are. Experimental and production test pilots are employed at all aircraft manufacturing plants which are located mainly in California, Washington, Kansas, Texas, Oklahoma, Georgia, Maryland, Missouri, Florida, New York, Pennsylvania, and Connecticut. Airline test pilots work wherever the airlines have overhaul bases, the largest ones of which are found in San Francisco, Miami, New York, Tulsa, and Kansas City.

Opportunities for Advancement. Engineering test pilots may advance to the position of Chief Test Pilot, as can production test pilots. Airline test pilots eventually may advance to the airline's engineering or maintenance administrative staff. Test pilot jobs are also available with the Federal Aviation Administration.

Outlook for the Future. The demand for engineering and production test pilots will fluctuate with the development and production of aircraft. Over the next decade the production of general aviation aircraft is expected to triple, while that of commercial air transports will level off due to the introduction of the new jumbo jets and the supersonic transport (SST). Predictions regarding the production of military aircraft are difficult to make. With the cessation of present hostilities, it is expected that production will decrease, and with it, a decrease in the need for production test pilots. The overall outlook for airline test pilots indicates a slight increase over the years reflecting the growing airline fleet.

AIRLINE PILOT OR CAPTAIN

Nature of the Work. The Airline Pilot or Captain plans each flight with the airline's flight dispatcher and meteorologist, checking weight, fuel supply, alternate destination, weather, and route. Briefs his crew, checks out takeoff procedures, satisfies himself the plane is operating normally before takeoff, gets takeoff clearance from Air Traffic Control, flies the plane over the designated route, lands the plane, and, if at his final destination, files a trip report. During the time he is aboard the aircraft, he supervises the work of the crew, gives them instructions, and makes all decisions. He is in command of the plane and is responsible for the safety of the aircraft, its passengers, crew, and cargo. The aircraft he flies may range from a twin-engine DC-3 with 30 passengers and crew on a 100-mile hop, to a four-engine Boeing 707 jet with more than 120 passengers crossing the ocean on an eight-hour non-stop flight.

Working Conditions. By law he cannot fly more than 85 hours a month or 1,000 hours a year. However, the average pilot works more than 100 hours a month counting ground duties such as filing flight plans, working on reports, briefing crews, and attending training classes. Spends most of his working day in the left hand cockpit seat, with additional time in the airline dispatcher's office and in training classrooms. Work schedules average sixteen days a month and usually provide for consecutive days off. Schedules for pilots employed by

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The co-pilot (left) helps the Captain make a flight plan.

transcontinental and international airlines require pilots to spend nights away from home. In these cases, hotel, transportation, and meal expenses are paid by the airline. A flight requires considerable pilot concentration during takeoff and landing maneuvers. Automatic piloting devices free the pilot for other cockpit duties and lessen the strain of the job during cruising flight. He is required to wear a uniform while on duty. Night flights are often required, especially for air cargo operations.

Where the Jobs Are. Scheduled airline flight crews are based at major terminals on their respective airline routes. These bases are found mainly in New York, Chicago, Los Angeles, San Francisco, Seattle, Detroit, Newark, Atlanta, Miami, Washington, D.C., Denver, and Dallas. Flight crew job opportunities are also available with all cargo airlines and with non-scheduled and supplemental airlines that provide charter service.

AIRLINE CO-PILOT OR FIRST OFFICER

Nature of the Work. The Airline Co-pilot or First Officer assists the captain by monitoring the flight instruments, handling radio communications, watching for air traffic, and taking over the flight controls when directed by the captain.

Working Conditions and Where the Jobs Are. Approximately the same as for the Airline Pilot.

FLIGHT ENGINEER OR SECOND OFFICER

(The latter title applies if he is required to have minimum training as a co-pilot.)

Nature of the Work. The Flight Engineer makes a walk-around inspection of the aircraft, checking approximately 200 items from nose wheel to rudder. He oversees fueling operations, reviews mechanics' reports, and assists the captain with pre-flight cockpit check. He also monitors engines, keeps track of fuel consumption, and the heating, pressurization, hydraulic, electrical, and air-conditioning systems. He troubleshoots and, if possible, repairs faulty equipment in flight, checks and maintains aircraft log book, reports mechanical difficulties to mechanic crew chief, and makes a final post-flight inspection of the aircraft.

Working Conditions. Work schedules are approximately the same as for the Airline Pilot. Is required to work outdoors during walk-around inspections in all weather conditions and in noisy surroundings.

Where the Jobs Are. Approximately the same as for the Airline Pilot.

OPPORTUNITIES FOR ADVANCEMENT — for Airline Pilots and Flight Engineers.

Promotion is regulated by seniority. When he is hired as a second officer, or co-pilot, he is assigned the bottom position within his airline. As the second officers, co-pilots, and pilots above him retire, resign, or are removed from the list for other reasons, he moves upward. All through his career with his airline, his earnings, route assignments, and vacation time preferences are governed by his seniority rank. Second officers or flight engineers may advance to co-pilot position within a year, but it usually takes from seven to twelve years to become a pilot or captain, depending on the size of the airline and rank on the seniority list. By law, pilots must retire when reaching age 60. All through his career he must lay his job on the line every six months at the time of his rigid physical exam. If he fails to pass, he must resign. Pilots who can no longer qualify as a line pilot frequently transfer to the airline's training department and take jobs as airline flight instructors, or they may take positions with the Federal Aviation Administration as air carrier operations inspectors or check pilots.

OUTLOOK FOR THE FUTURE — for Airline Pilots and Flight Engineers

The general trend in air transportation has been upward since World War II and there are enough positive factors in the picture to conclude this trend will continue. The increasing volume of airline passengers, the explosive growth of air cargo service, the introduction of the supersonic transport (SST), and new short-haul aircraft for local service add up to a larger air transport fleet and a rise in the number of additional flight officers required. The FAA estimates that over the next ten years airline fleets will expand from 2,500 to 3,500 aircraft. The airlines employed more than 21,000 pilots at the end of 1966, for a gain of 7,500 over the 1960 total. A projected need is for 43,665 by the end of 1980. By 1980 the airlines will need 1,200 new flight officers each year just to replace retiring pilots, plus about 400 additional flight officers to fill requirements for new aircraft placed in service.

OPPORTUNITIES FOR TRAINING — for Career Pilots and Flight Engineers

There are several approaches to acquiring pilot training. First, is through flight instruction in FAA-certificated flying schools. The student must be at least 16 years of age and be able to pass a third class medical examination. Courses consist of 40 hours of ground school instruction where students learn the principles of flight, aerial navigation, weather factors, and flight regulations. Flying lessons are conducted in dual-controlled aircraft (25 hours dual and 10 hours solo instruction). The instructor judges when his student is ready to take both written and flight examinations which are given by FAA inspectors. Upon successful completion of both exams, he earns his private pilot's license which entitles him to fly passengers, but not for hire. The private pilot can then undertake advanced instruction, learn to fly on instruments and earn a commercial pilot's license provided he has acquired additional hours of flight experience. These achievements open up numerous pilot careers to him because now he can fly for hire. Further study and experience could eventually earn him the Air Transport Rating to qualify him as an airline pilot. However, few students arrive at this point in this fashion as it takes many years and considerable financial expenditure.

A second method of acquiring flight training is through pilot training in the armed forces. This entails no expense, and with some additional study, the military pilot can qualify for numerous civilian pilot jobs when he leaves the service. The military services have been a major source of pilots for the airlines in the past.

Thirdly, a growing number of colleges and universities offer flight training with credit toward a degree. The graduate leaves school with a private or commercial license, and in a few cases, an Air Transport Rating, plus his degree.

Helicopter pilots can receive training in the armed forces or at special private FAA-certificated helicopter flight schools. Agricultural pilots can receive specialized advanced training at such schools as Ohio State University, Texas A & M, or the Agricultural Aviation Academy in Nevada.

Public Law 90-77, the "Veterans Pension and Readjustment Assistance Act of 1967", approves financial assistance for ex-servicemen who are qualified to take flight training leading to a commercial pilot's license. To qualify they must have been in the service more than 180 days, possess a private pilot's license or the equivalent number of flight hours to earn such a license, pass a Class II medical examination and take advanced flight training in an approved school for the purpose of preparing for a career in aviation. The Act covers the period up to August 31, 1975.

Some airlines offer training courses for corporate pilots transitioning to new jet aircraft. The airlines' experience in jet flight training makes them particularly well qualified to provide this service to business firms.

For those who aspire to be airline pilots, some of the larger airlines accept outstanding college graduates for training as second officers provided the applicant earns a commercial license on his own within a year of acceptance by the airline. He then undergoes six to eight weeks ground school instruction related to the type of aircraft to which he will be assigned. Successful completion of this course gives the student pilot a flight engineer's license. Then follows three months of simulator training and actual flight experience, with a final check out and assignment on the line as a flight engineer, or second officer.

WHERE TO OBTAIN FURTHER INFORMATION — about career pilots and flight engineers. (Be sure to be as specific as possible when making each request.)

Air Line Navigators Council 9574 Lake Shore Blvd., N.E. Seattle, Washington 98115	For airline navigator information
Air Line Pilots Association International 55th St. and Cicero Ave. Chicago, Ill. 60638	For airline pilot and co-pilot information
Air Transport Association of America 1000 Connecticut Ave., N.W. Washington, D.C. 20036	Brochure, Your Career with the Airlines Free.
Allied Pilots Association 405 Lexington Ave. New York, New York 10017	For airline pilot and co-pilot information
American Airlines 633 Third Ave. New York, N.Y. 10017	Key to An Exciting Career. Free booklet.
Careers Box 135 Largo, Florida 33540	Career Summaries: Navigator-Copilot, Airplane. No. 62S. 15¢. Pilot, Helicopter. No. 340S. 15¢. Career Briefs: Flight Officer, Second. No. 123B. 25¢. Pilot, Commercial Airplane. No. 58B. 25¢.
Chronicle Guidance Publications Moravia, New York 13118	Occupational Brief: Airplane Pilot, Commercial. No. 29. 35¢
Federal Aviation Administration Hq. Operations - HQ-438 Department of Transportation Washington, D.C. 20590	Flight Training Schools Affiliated with Institutions of Higher Learning. A free list.
Flight Engineers International Assoc. 100 Indiana Ave., N.W. Washington, D.C. 20001	Safety in the Jet Age. Free booklet about the role of the flight engineer.
Jeppesen and Co. 8025 E. 40th Ave. Denver, Colo. 80207	"Who, Me ? Fly an Airplane?". Free booklet.
National Aerial Applicators Association 919 - 18th St., N.W. Washington, D.C. 20036	For general information about the agricultural pilot
National Aerospace Education Council Room 616, 806 - 15th St., N.W. Washington, D.C. 20005	Career Opportunities in Aviation. An illustrated booklet. 50¢

National Air Taxi Conference 1346 Connecticut Ave., N.W. Washington, D.C. 20036	For general information about air taxi business
National Association of Flight Instructors P.O. Box N Washington, D.C. 20014	For general information about flight instructors
National Business Aircraft Association 425 - 13th St., N.W. Washington, D.C. 20004	For general information about the corporate pilot
Pan American World Airways Education Service Pan Am Building New York, N. Y. 10017	Pilot career information. Free.
Science Research Associates 259 E. Erie St. Chicago, Ill. 60611	Occupational brief: Airplane Pilots. No. 31. 40¢.
The Society of Experimental Test Pilots P. O. Box 986 Lancaster, Calif. 93535	For general information about experimental, or engineering, test pilots.
Superintendent of Documents U.S. Government Printing Office Washington, D.C. 20402	Student Pilot Guide. No. FAA 5.8/2:P 64/8/1965. 15¢. Explains how to obtain student and private pilot licenses.
United Air Lines Employment Office, P.O. Box 8775 Chicago, Ill. 60611	Booklet. Career Opportunities as a United Air Lines Flight Officer, Flight Instructor, or Flight Operations Instructor. Free.

CHAPTER FOUR

Aviation Mechanics (Including Repairmen)

Nature of the Work. Aviation mechanics have the important responsibility of keeping airplanes airworthy or in a safe and efficient condition to fly. They service, repair, overhaul, and test aircraft airframes, engines, propellers, aircraft systems, electronic equipment, and aircraft instruments.

Aviation mechanics may be licensed or unlicensed. The licensed mechanic holds either an Airframe and Powerplant (A&P) mechanic's certificate or a Repairman's certificate from the Federal Aviation Administration, or a Second Class Radio Telephone license (or better) from the Federal Communications Commission. These are issued upon successful completion of oral, written, and practical examinations. The A&P certificate allows a mechanic to work on any part of the aircraft's engines, airframe, and systems. The mechanic with the FAA's Repairman certificate can work on those parts of the aircraft that his certificate specifically allows, such as radio or instruments. If the repairman mechanic works on transmitting equipment aboard the aircraft (radio, radar, etc.), he must also hold at least the FCC Second Class Radio Telephone license.

Unlicensed mechanics and apprentice mechanics may work on various parts of the plane under the supervision of a licensed mechanic who must sign his approval of the work before the aircraft or its equipment is considered airworthy.

Aviation mechanics employed by the airlines perform either line-maintenance work, i.e., routine maintenance or emergency repairs at airline terminals, or major repairs or periodic inspections at an airline's overhaul base. Aviation mechanics employed in general aviation do maintenance and repair work similar to airline mechanics; however, the equipment they service is generally smaller and less complex.

Working Conditions. Depending upon the type of work they do, aviation mechanics work in hangars, on the flight line, and in repair shops. They use hand and power tools and test equipment. Flight line mechanics sometimes must work outdoors even in disagreeable weather in order to make emergency repairs. This is sometimes precarious work because of the use of a ladder or scaffold. The physical demands can be heavy—with frequent lifts or pulls of up to 50 pounds. Physical requirements include stooping, kneeling, crouching, crawling, reaching, handling, fingering, and feeling. Noise and vibration are common.

Aviation mechanics often must work under the pressure of time to maintain airline flight schedules or, in general aviation, to keep from inconveniencing customers beyond a reasonable time. At the same time, the aviation mechanic cannot sacrifice his standards of workmanship to speed up the job.

Where the Jobs Are. The scheduled airlines employ about 43,600 mechanics at large airline terminals and at overhaul bases which are concentrated in the major terminal areas in New York, Los Angeles, San Francisco, Chicago, Miami, Denver, and Atlanta.

Another 40,000 aviation mechanics work at independent repair stations or in instrument repair shops located at or near most of the nation's 10,000 airports.

The military services employ about 26,500 civilian aviation mechanics to work on military aircraft at Army, Navy, and Air Force aviation installations all over the country.

In addition, several thousand mechanics work for air taxi operators, aerial applicators, supplemental airlines, corporations owning a fleet of aircraft, aircraft manufacturers, and the Federal Aviation Administration. The majority of FAA mechanics are located at the FAA Aeronautical Center in Oklahoma City, Oklahoma.

Aviation mechanics holding the FAA Repairman's certificate may be employed only at FAA-certificated repair stations or at airline shops.

The most logical starting point is your local airport.

Wages and Benefits. Aviation mechanics generally work 40 hours a week on eight-hour shifts around the clock; presently, overtime work is common. Airline mechanics earn more than general aviation mechanics. An apprentice mechanic working for an independent repair station can expect from $1.50 to $2.50 an hour. Unlicensed mechanics make $1.76 to $2.75 an hour, while A&P mechanics command $2.44 to $3.50. Airline mechanics start at $3.53 an hour, and under the terms of a 1965 wage settlement, this rate will increase to $4.13 by 1968.

Cessna Aircraft statisticians recently compared hourly pay rates for mechanics in the Wichita, Kansas area:

Airline mechanics	$3.53–$4.08
Automotive mechanics	3.25– 3.75
Truck and Tractor mechanics	3.00– 3.75
Large Fixed-Base Operator mechanics	2.50– 3.75
Technicians, Manufacturing Industry	2.50– 3.75
TV technicians	3.00
Appliance Service technicians	2.15– 3.10

Below is a comparison between the wages of aviation mechanics and line service personnel at fixed bases and auto mechanics and gasoline service station attendants.

Paid holidays and paid vacations, health and life insurance plans, employee suggestions plans with cash awards, retirement pensions, and sick leave are offered in varying degrees by both the airlines and independent repair station operators (general aviation). Airlines also extend free or reduced air transportation to employees and their families. General aviation offers more local points of employment.

The International Association of Machinists and Aerospace Workers and the Transport Workers Union of America are the chief unions for aviation mechanics.

Opportunities for Advancement. The appren-

HOURLY LABOR RATES
MECHANICS, TECHNICIANS, LINE PERSONNEL

	Starting Rate	High Rate	Medium Rate
Mechanics (licensed A&P) (General Aviation)	2.44	3.50	2.96
Auto Dealers Journeymen mechanics		Apprentice mechanics only on hourly. Journeymen mechanics on job rate or commission, Average $202.00 weekly, 44 hours ($4.60 hr)	
Mechanics (unlicensed) (General Aviation)	1.96	2.75	2.36
Apprentice Mechanics	1.50	2.50	2.10
Line Personnel	1.26	2.34	2.00
Gasoline Service Station Attendants	1.50	2.95	2.25
Electronics Technicians	2.94	3.90	3.51
TV Service Shops	3.00	3.50	3.25

Source: Business & Commercial Aviation, February 1967.

tice mechanic or repairman having the required experience with engines, airframes, or avionics (airborne electronics), and who is a graduate of an approved aviation mechanics course can acquire the A&P or Repairman's Certificate or the FCC license upon successful completion of oral, written, and practical FAA or FCC examinations. Mechanics who aspire to these top ratings have opportunities to advance to higher paying jobs as lead mechanic (or crew chief), inspector, lead inspector, and shop foreman.

Promotion to these higher grade jobs with the airlines is usually acquired on the basis of company examination. A few advanced-rating mechanics with administrative ability reach supervisory and executive positions. Some who have broad experience in maintenance and overhaul become inspectors for the Federal Aviation Administration.

Mechanics with at least three years of multi-engine experience who aspire to a flying career may take FAA examinations for the position of flight engineer, with opportunities to become, eventually, a co-pilot and pilot.

Requirements to Enter the Job. Educational: While a high school diploma is not required to become an apprentice aviation mechanic, employers give preference to applicants who are high school or vocational school graduates; thus, such a diploma is practically essential. Mathematics, physics, chemistry, English, and aerospace education courses are suitable subjects to pursue while in high school, as the aviation mechanic must understand many physical principles involved in the operation of the aircraft and its systems. The ability to read maintenance manuals and air regulations and to maintain aircraft logs and records is also important. A high school diploma is a prerequisite to attending a technical school or a college offering A&P training. The aviation mechanic is expected to continue his education even after he is on the job in order to keep abreast of the continual technical improvements to aircraft and aircraft systems.

Physical: The aviation mechanic should be in good health, with no physical handicaps that would prevent him from carrying out his duties which, at times, can be rigorous.

Personality: The successful aviation mechanic has an above average mechanical ability and desire to work with his hands and with tools. He has an interest in aviation, an appreciation of the importantce of doing a job carefully and thoroughly, and a desire to continue to learn throughout his career.

Pan American World Airways photo

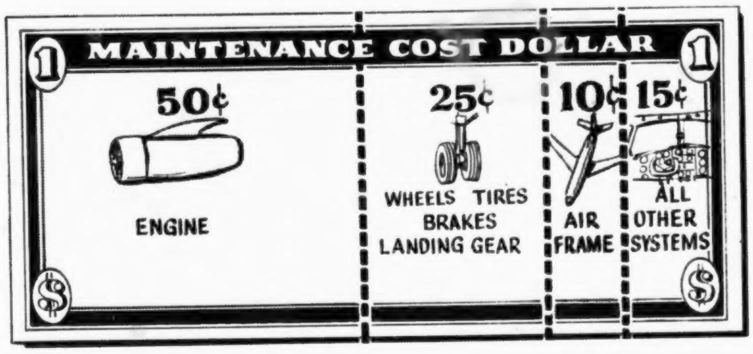
Opportunities for Training. The qualified student who wishes to become an aviation mechanic can follow one of several paths:

1. He can begin work for an airline or an independent repair station as an apprentice mechanic, learning as he earns. This type of training requires more time to earn an A&P or Repairman's Certificate, or the FCC license, and earning power remains at a lower rate over a longer period of time.

2. He can take aviation mechanic courses at one of the many FAA-certificated private or public technical schools. A high school diploma is required for entrance to these schools, but the period of training is shorter than on-the-job training and earnings upon completion of the course are higher. Also, the graduate of such a course is qualified to take the FAA or FCC exams when he finishes the course.

3. He can receive training as an aviation mechanic while in the military service. With some additional study, he can qualify for a

In addition to this anticipated growth, the student aviation mechanic has an age advantage. The average age of the aviation mechanic is about 41 years. In 1965 only 21 per cent of the certificated mechanics were 34 years old or younger, while 65 per cent were more than 40 years old. The number of mechanics retiring each year is expected to increase to about 3,300 in 1980. This fact, coupled with the predicted growth of aviation, indicates there will be many advantageous employment opportunities for the aviation mechanic—at least over the next decade.



How maintenance costs break down. Despite vast improvement in reliability, the engine still accounts for half of maintenance dollar.

Source: Air Transport World, September 1967.

FAA CERTIFICATED MECHANIC SCHOOLS AS OF AUGUST 1, 1966

Key to Ratings: A Airframe Mechanic P Powerplant Mechanic C Combined Airframe and Powerplant Mechanic

EASTERN REGION

Academy of Aeronautics
La Guardia Field
Flushing, N.Y. 11757 (APC)

Aviation High School
Queens Blvd & 35th St.
Long Island City, N.Y. 11101 (AP)

Burgard Vocational High School
400 Kensington Ave.
Buffalo, N.Y. 14225 (APC)

East Coast Aero-Tech. School, Inc.
P.O. Box 12
Lexington, Mass. 02173 (APC)

East New York Vocational
& Technical School
Fountain Ave. & Wells St.
Brooklyn, N.Y. 11208 (P)

Essex County Vocational
& Tech. High School
209 Franklin St.
Bloomfield, N.J. 07003 (APC)

Harvard H. Ellis Regional
Vocational Tech. School
Maple St., P.O. Box 149
Danielson, Conn. 06239 (APC)

Mergenthaler Vocational
Tech. High School
Hillen Road & 35th St.
Baltimore, Md. 21218 (C)

Pittsburgh Institute of Aeronautics
Allegheny County Airport
P.O. Box 10897
Pittsburgh, Pa. 15236 (APC)

Quaker City School of Aeronautics
2563-69 Grays Ferry Ave.
Philadelphia, Pa. 19146 (APC)

Rome MDTA Airplane
Mechanics School
Buildings 325, 326, 917
Griffiss Air Force Base
Rome, New York 13442 (APC)

Teterboro School of Aeronautics, Inc.
Teterboro Airport
Teterboro, N.J. 07608 (APC)

Wentworth Institute
550 Huntington Ave.
Boston, Mass. 02115 (APC)

Williamsport Area
Community College
1005 West Third St.
Williamsport, Pa. 17701 (AP)

SOUTHERN REGION

Alabama Institute of
Aviation Technology
1439 South Union Ave.
Ozark, Ala. 36360 (APC)

Eastern Air Lines, Inc.
Mechanic Training School
P.O. Box 787
International Airport Br.
Miami, Fla. 33142 (APC)

Emby-Riddle Aero. Inst.
Daytona Beach Municipal Airport
P.O. Box 2411
Daytona Beach, Fla. 32016 (APC)

Florence-Darlington Technical
Education Center
P.O. Box 384
Florence, S.C. 29501 (AP)

George T. Baker Aviation School
3275 N.W. 42nd Ave.
Miami, Fla. 33142 (APC)

Lively Technical School
Duval St. and Park Ave.
Tallahasee, Fla. 32301 (APC)

Miguel Such Metropolitan
Vocational School
Barbosa Ave. (Carpenter Road)
Rio Pieoras, P.R. 00923 (AP)

South Georgia Technical
& Vocational School
P.O. Box 560
Americus, Ga. 31709 (APC)

SOUTHWEST REGION

Aeronautical Technology
The Technical Institute
Oklahoma State University
Stillwater, Okla. 74074 (APC)

Delgado Trades and
Technical Institute
615 City Park Ave.
New Orleans, La. 70119 (APC)

LeTourneau College of
Aeronautical Technology
P.O. Box 2307
Longview, Tex. 75604 (AP)

Spartan School of Aeronautics
P.O. Box 51239
Tulsa International Airport
Tulsa, Okla. 74151 (APC)

Technical High School
& Technical Institute
1003 West Cannon Ave.
Fort Worth, Tex. 76104 (APC)

CENTRAL REGION

Aero Mechanics School
13214 French Road
Detroit, Mich. 48234 (AP)

Aero Mechanics School
838 Richards Road
Municipal Airport
Kansas City, Mo. 64116 (APC)

Area Technical-Vocational School
Thief River Falls, Minn. 56701 (APC)
Board of Education—City of Chicago
228 N. La Salle St.
Chicago, Ill. 60604 (APC)

Des Moines Technical School
1800 Grand Ave.
Des Moines, Iowa 50307 (C)

Helena Public School—
Dept. of Aeronautics
& Related Trades
2300 East Poplar Ave.
Helena, Mont. 59601 (APC)

Hoffmann Aircraft Institute
7924 Floyd
Overland Park, Kan. 66204 (P)

Janesville Vocational, Technical
and Adult School
527 S. Franklin St.
Janesville, Wis. 53545 (APC)

Kundert Aviation, Inc.
Box 1467, Hector Field
Fargo, N.D. 58102 (APC)

Lewis College, Technical Institute
Route 66A
Lockport, Ill. 60441 (APC)

Lincoln Aviation Institute, Inc.
Municipal Airport
Lincoln, Neb. 68524 (C)

Milwaukee Vocational Technical
and Adult Schools
9305 W. Appelton Ave.
Timmerman Field
Milwaukee, Wis. 53225 (AP)

Minneapolis Vocational
H.S. & Tech. Inst.
1101 Third Ave. So.
Minneapolis, Minn. 55404 (AP)

Moody Bible Inst.
820 N. La Salle St.
Chicago, Ill. 60610 (C)

Parks College of Aeronautical Tech.
of St. Louis Univ.
Parks Airport
East St. Louis, Ill. 62201 (APC)

Purdue University,
Dept. of Aviation Tech.
Lafayette, Ind. 47907 (AP)

Southern Illinois University
Aviation Technology
Southern Illinois Airport
Carbondale, Ill. 62901 (APC)

University of Illinois,
Institute of Aviation
Univ. of Ill. Willard Airport
Savoy, Ill. 61874 (APC)

Vincennes University,
Aviation Technology Dept.
1002 N. First St.
Vincennes, Ind. 47591 (C)

Watertown Aviation
Mechanics School
Municipal Airport
Watertown, S.D. 57201 (A)

Western Michigan University
Kalamazoo, Mich. 49001 (C)

WESTERN REGION

Big Bend Community College
Moses Lake Municipal Airport
Highway 17 & Nelson Rd.
Moses Lake, Wash. 98837 (A)

Chaffey College,
5885 Haven Ave.
Alta Loma, Calif. 91701 (APC)

Clover Park Vocational-
Technical School
4500 Steilacoom Blvd., S.W.
Lakewood Center, Wash. 98499 (APC)

College of San Mateo
1700 Hillsdale Blvd.
San Mateo, Calif. 94402 (AP)

Deuel Vocational Inst.
P.O. Box 400
Tracy, Calif. 95376 (APC)

Gavilan College
2310 San Felipe Rd.
Hollister, Calif. 95023 (C)

Emily Griffith Opportunity School
13th and Welton Sts.
Denver, Colo. 80204 (APC)

Fresno City College
1101 University Ave.
Fresno, Calif. 93704 (APC)
Glendale College
1500 North Verdugo Road
Glendale, Calif. 91208 (APC)

Holgate Technical School
5925—3rd Ave., South
Seattle, Wash. 98108 (AP)

John A. O'Connell Vocational
H.S. and Tech. Inst.
21st & Harrison St.
San Francisco, Calif. 94110 (AP)

Kensair Technical Training School
Jefferson County Airport
Broomfield, Colo 80020 (APC)

Lane Community College
200 North Monroe St.
Eugene, Oreg. 97402 (AP)

Laney College—Peralta
College School District
1001 3rd Avenue
Oakland, Calif. 94606 (APC)

Long Beach City College
Bus. and Tech. Div.
1305 East Pacific Coast Highway
Long Beach, Calif. 90806 (APC)

Los Angeles Trade and
Technical College
9700 So. Sepulveda Blvd.
Los Angeles, Calif. 90045 (APC)

Mt. San Antonio College
1100 N. Grand Ave.
Walnut, Calif. 91789 (APC)

Northrop Institute of Tech.
1155 W. Arbor Vitae St.
Inglewood, Calif. 90301 (APC)

Palo Alto Unified School Dist.
50 Embarcadero Road
Palo Alto, Calif. 94301 (P)

Phoenix Union High School
512 East Van Buren Street
Phoenix, Ariz 85004 (P)

Reedley College
Manning & Reed Ave.
P.O. Box 552
Reedley, Calif. 93654 (APC)

Sacramento City College
3835 Freeport Blvd.
Sacramento, Calif. 95822 (APC)

San Bernardino Valley College
701 So. Mt. Vernon Ave.
San Bernardino, Calif. 92410 (APC)

San Diego City College
1425 Russ Boulevard
San Diego, Calif. 92101 (C)

San Jose State College
San Jose, Calif. 95112 (APC)

School of Trade and Technical
Education
Idaho State University
Pocatello Municipal Airport
Pocatello, Idaho 83201 (AP)

Spokane Community College
E. 3403 Mission Ave.
Spokane, Wash. 99202 (AP)

Utah State University of Agriculture
& Applied Sciences
Aeronautics Dept.
College Hill
Logan, Utah 84321 (APC)

PACIFIC REGION

Aero-Tech Division of
Honolulu Technical School
Honolulu International Airport
Honolulu, Hawaii 96819 (APC)

ALASKAN REGION

North Star Borough School of
Aviation
1504 Gillam Way
Fairbanks, Alaska 99701 (AP)

Where to Obtain Further Information - about aviation mechanics. (Be sure to be as specific as possible when making each request.)

Information Services Department Air Transport Association 1000 Connecticut Ave., N.W. Washington, D.C. 20036	"Your Career with the Airlines". Free.
Supervisor - Personnel American Airlines, Inc. 633 Third Avenue New York, N. Y. 10017	"American Airlines - Key to an Exciting Career". Free.
Federal Aviation Administration Printing Branch, HQ-438 Washington, D.C. 20553	Advisory Circular No. AC 147-2A "Federal Aviation Agency Certificated Mechanic School Directory." Free
International Association of Machinists and Aerospace Workers 1300 Connecticut Ave., N.W. Washington, D.C. 20036	General Information. Free.
National Aerospace Education Council Room 616 - 806 15th St., N.W. Washington, D.C. 20005	*Career Opportunities in Aviation.* 50¢.
National Aviation Trades Association 1346 Connecticut Ave., N.W. Washington, D.C. 20036	Names and addresses of aircraft repair stations nearest you. Free.
State Director of Vocational Education Capital city of your state	Location of vocational courses. Free.
Your local State Employment Service	General Information. Free.
Superintendent of Documents U.S. Government Printing Office Washington, D.C. 20402	*Employment Outlook for Airplane Mechanics.* Bureau of Labor Statistics Bulletin No. 1450-96. 15¢.
Transport Workers Union of America Air Transport Division 1980 Broadway New York, N. Y. 10023	General Information. Free.
Employment Office United Air Lines O'Hare Field Station, P.O. Box 8775 Chicago, Illinois 60666	"Jet Age Aircraft Maintenance with United Air Lines". Free.

CHAPTER FIVE

Airline Careers

GENERAL INFORMATION

Career opportunities with the airlines range from those requiring practically no training (cleaners) to those demanding college degrees (aeronautical engineer) and years of intensive training and experience (pilot). In between are dozens of jobs calling for a variety of educational achievement levels, skills, and personal characteristics. Brief descriptions of the nature of these jobs, working conditions, wages, opportunities for advancement, and requirements for entry are outlined on the following pages. Data about airline pilots, co-pilots, flight engineers, stewardesses, and mechanics are omitted, as they are treated separately elsewhere in the GUIDE.

Salaries, working conditions, and opportunities for advancement vary according to the size of the airline. The larger the airline, the greater are the opportunities — and the competition. Scheduled airlines of the United States range in size from those with less than 50 employees and two stations to those with more than 45,000 employees working in 127 locations. Several U.S. international airlines fly to foreign airports throughout the free world. Big trunk routes span the continent connecting large population centers. A number of these airlines also fly over international waters to Alaska, Hawaii, and to Caribbean destinations. Other airlines are local service carriers that fly within a region of the United States, giving service to smaller communities and connecting them with the big cities serviced by the trunk airlines. Three helicopter airlines serve the New York City, Los Angeles, and San Francisco metropolitan centers. In addition there are a small number of all-cargo airlines, numerous carriers flying only within the boundaries of a state, and 13 supplemental air carriers that fly passengers and cargo on unscheduled charter flights. "Third level" airlines that fly light aircraft over short routes on schedules to connect with trunk and local service airlines are showing steady growth. Some of these airlines even operate small business-type jets. (See page 76 for description of air carriers.)

In general, no matter what job is offered, a high school diploma is required for jobs with the airlines. All workers regardless of their jobs, are given some degree of on-the-job training. Some private technical schools offer courses in airline operations such as reservations, ticketing, teletypist, and stewardess training. This training may give an applicant an advantage, but as airlines have their own training procedures, interested young people are urged to check with the airline of their choice to see what pre-employment training is required.

The airline industry is characterized by continuous updating of equipment and working methods, requiring re-training of personnel from time to time. Few industries are so involved with employee training programs which give employees new skills at the company's expense and keep them abreast of new equipment techniques. Whether a pilot, mechanic, stewardess, baggage handler, ticket sales agent, or a manager, periodic training is mandatory. These expanding training programs provide opportunities for employees to advance to jobs on training staffs.

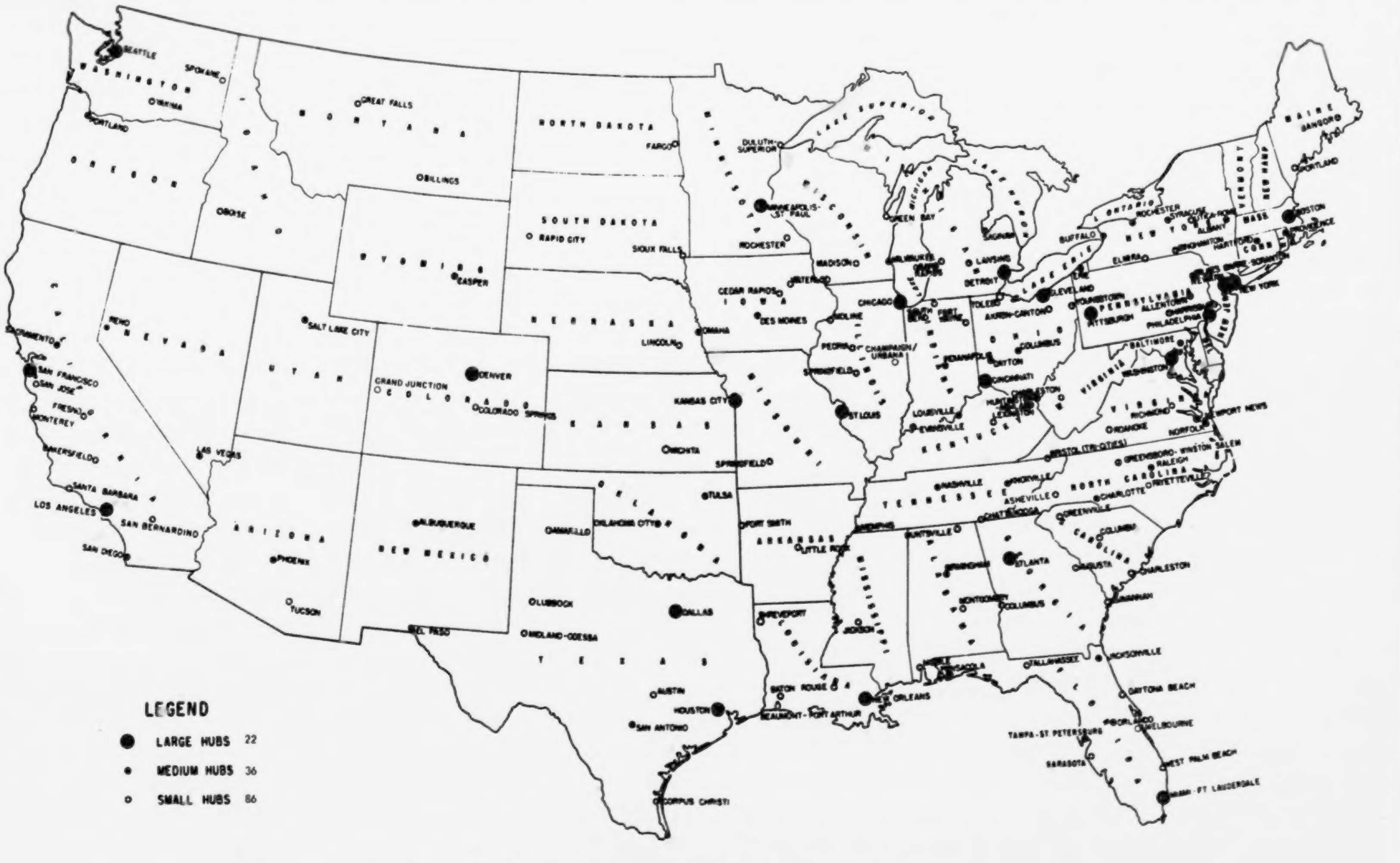
Employees enjoy such benefits as paid vacations, holidays and sick leave, health and group life insurance coverage, retirement income plans, credit unions for savings and loan purposes, employee suggestion programs with cash awards, and free air travel or air travel at greatly reduced rates for employees and members of their families. In addition, they often receive large discounts for travel on international airlines and for hotel accommodations at holiday destinations. The average annual salary of airline employees is $8,800, or close to the top for all U.S. industry.

Promotions are almost always made from within the company as vacancies are filled by advancing the best qualified workers from the ranks. Merit promotions are made periodically on the basis of evaluation of the employees' work.

Shift work is a characteristic of many jobs with airlines, for passengers travel all hours of the day and night and passenger and air cargo services must be available. Dissatisfaction with shift work is the most common cause of job turnover, even though hourly wages are increased for workers on afternoon and evening shifts. Smoking on the job is prohibited wherever the job is involved with cleaning, servicing, or overhauling the aircraft, or when dealing with the public.

Uniforms are required by all personnel who deal directly with the public, who are normally seen by the public, or who need special clothing for utility or sanitary reasons (cleaners, mechanics, and kitchen workers). While employees are usually required to purchase their own uniforms, the need for a certain amount of personal clothing for working hours is thereby reduced.

Airline jobs are located in every city airlines serve and even in a few they don't serve. Of course, the larger the city, the greater the variety of airline job opportunities. The largest concentrations of airline career opportunities are found in such cities as New York, Chicago, Los Angeles, San Francisco, Miami, Washington, D.C., Detroit, Kansas City, Atlanta, Boston, and Seattle. An applicant may obtain career information by writing to the airline he is interested in. In addition, foreign airlines flying into U.S. airports employ thousands of U.S. employees to handle their passenger and air cargo business and to service their aircraft during stopovers.


LEGEND
● LARGE HUBS 22
• MEDIUM HUBS 36
○ SMALL HUBS 86
SEATTLE
SPOKANE
PORTLAND
GREAT FALLS
BILLINGS
BOISE
FARGO
RAPID CITY
SIOUX FALLS
CASPER
SALT LAKE CITY
RENO
SACRAMENTO
SAN FRANCISCO
SAN JOSE
FRESNO
MONTEREY
BAKERSFIELD
SANTA BARBARA
LOS ANGELES
SAN BERNARDINO
SAN DIEGO
LAS VEGAS
PHOENIX
TUCSON
DENVER
GRAND JUNCTION
COLORADO SPRINGS
ALBUQUERQUE
EL PASO
AMARILLO
LUBBOCK
MIDLAND-ODESSA
DALLAS
AUSTIN
SAN ANTONIO
HOUSTON
CORPUS CHRISTI
OKLAHOMA CITY
TULSA
WICHITA
KANSAS CITY
LINCOLN
OMAHA
DES MOINES
CEDAR RAPIDS
ROCHESTER
MINNEAPOLIS-ST. PAUL
DULUTH-SUPERIOR
MADISON
CHICAGO
PEORIA
SPRINGFIELD
ST. LOUIS
LOUISVILLE
EVANSVILLE
INDIANAPOLIS
CINCINNATI
DAYTON
COLUMBUS
TOLEDO
DETROIT
LANSING
CLEVELAND
AKRON-CANTON
PITTSBURGH
BUFFALO
ROCHESTER
SYRACUSE
ELMIRA
ALLENTOWN
PHILADELPHIA
NEW YORK
HARTFORD
PROVIDENCE
BOSTON
PORTLAND
BANGOR
BALTIMORE
WASHINGTON
RICHMOND
ROANOKE
NORFOLK
NASHVILLE
KNOXVILLE
ASHEVILLE
CHARLOTTE
RALEIGH
GREENVILLE
COLUMBIA
CHARLESTON
SAVANNAH
ATLANTA
COLUMBUS
MONTGOMERY
BIRMINGHAM
HUNTSVILLE
CHATTANOOGA
MEMPHIS
LITTLE ROCK
FORT SMITH
SHREVEPORT
JACKSON
BATON ROUGE
NEW ORLEANS
BEAUMONT-PORT ARTHUR
MOBILE
PENSACOLA
TALLAHASSEE
JACKSONVILLE
DAYTONA BEACH
ORLANDO
MELBOURNE
TAMPA-ST PETERSBURG
SARASOTA
WEST PALM BEACH
MIAMI-FT LAUDERDALE
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
NEW JERSEY
MAINE
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
ONTARIO

Air Traffic Hubs as of December 31, 1965.

These employment opportunities should not be overlooked.

The airline industry is a young industry, and its glamorous reputation attracts youth. Morale is high among employees who seem to acquire a certain loyalty to their company and to the airline industry. While the average turnover in U.S. industry runs about four per cent per month, turnover within the airlines amounts to one per cent per month. Jobs with airlines tend to carry an aura of prestige in the community, reflecting the vitality of technological progress and the romance and excitement associated with air travel and far away places.

FLIGHT DISPATCHER

Nature of the Work. In cooperation with the pilot, the Flight Dispatcher furnishes a flight plan that enables the aircraft to arrive at its destination on schedule with the maximum payload and the least operating cost. He considers enroute and destination weather, winds aloft, alternate destinations, fuel required, altitudes, and traffic flow. His signature, along with that of the pilot, releases the aircraft for flight. Maintains constant watch on all flights he dispatches and is the go-between for the pilot and ground service personnel. Keeps all personnel concerned with the flight informed as to the status of the flight. Must be familiar with navigation facilities over airline routes and at airports and with the takeoff, cruising, and landing characteristics of all types of aircraft operated by the airline. He must also take periodic flights to observe flight routes, conditions, and airports, riding in the cockpit with the flight crew.

Working Conditions. He works indoors at the airport in the airline operations office. Uses slide rules, weather charts and information, loading reports, and hand computers. A forty-hour week with shift work is normal. Frequently works under pressure, especially when flying weather is bad. Must make many rapid decisions concerning safety, flight regulations, and the economy of operations. He is surrounded by teletype machines, telephones, and intercom systems in a noisy, busy atmosphere. If he works for a small airline, he also carries on the duties of a meteorologist and schedule coordinator.

Wages. Wages are from $650 to $1,200 per month, depending upon the size of airline.

Opportunities for Advancement. Flight dispatchers have moved up into this position from jobs as former dispatch clerks, junior flight dispatchers, radio operators, meteorologists, or station managers. Large airlines employ senior dispatchers who specialize in coordinating the economic factors of every flight. Promotion is always from within. Experience as an airline dispatcher may be used in qualifying for a job as an air traffic controller with the Federal Aviation Administration or as an airport director.

Requirements to Enter the Job. A college degree with a major in air transportation or meteorology is acceptable preparation. He must have good vision, hearing, enunciation, and a FAA dispatcher's license. Must know thoroughly the Civil Air Regulations and airline operations based on years of experience in airline communications or meteorology. Very few women are employed as dispatchers.

METEOROLOGIST

Nature of the Work. The Meteorologist analyzes weather data and prepares weather reports for the flight dispatcher, pilots, and other airline personnel concerned with weather information. He assists the flight dispatcher in preparing flight plans.

Working Conditions. He works indoors at the airport in the airline operations office. Uses weather facsimile machines, teletype machine, weather charts, and other meteorological data. Shift work is required and the normal work week consists of forty hours.

Wages. Wages are from $600 to $1,800 per month, depending upon the size of the airline.

Opportunities for Advancement. With a large airline, he may become chief meteorologist or take a position as an assistant flight dispatcher. He may also use this experience to become a meteorologist for the U.S. Weather Bureau.

Requirements to Enter the Job. A college degree with a major in meteorology is required. Experience with military weather services or with the Weather Bureau is frequently required. Meteorology training can be obtained with the military services, especially as a meteorological technician.

Eastern Airlines photo

Schedule coordinators can talk to any airline office, or to any aircraft on the ground or in flight. Their office is the nerve center of airline operations.

SCHEDULE COORDINATOR

Nature of the Work. The Schedule Coordinator keeps track of the whereabouts of aircraft and crews; receives and relays reports of delays due to weather and mechanical problems; notifies all concerned regarding delays or changes; and gives orders for substitution of aircraft when required. He works with diversions of flights to alternate airports, weather factors affecting air traffic, seating arrangements of planes, turn-arounds, estimated time of arrival, and unscheduled stops. He also works out aircraft availability, taking into consideration servicing and maintenance requirements with time frequencies varying from 24 to 48,000 hours. Handles crew scheduling, considering sick calls, vacations, days off, used-up flight hours, "deadheading," types of aircraft for which crew is trained, and seniority bids or choices of flights selected by crew members. All this work is in the interest of maintaining on-time, efficient service for passengers and shippers of air freight.

Working Conditions. He works indoors at the airport in the airline operations office. He is in a busy atmosphere, surrounded by banks of phones, teletype machines, computers, and charts. At times he works under pressure. Works cooperatively with colleagues. A forty-hour work week, with shift work, is normal.

Wages. Wages are from $500 to $765 per month, depending upon size of airline.

Opportunities for Advancement. He starts as clerk with responsibilities in one or two areas but may advance to assistant, senior, and then chief of schedule control. May also work up to position in dispatcher's office as general dispatch clerk or an operations planner.

Requirements to Enter the Job. A college degree with a major in air transport operations is acceptable preparation.

STATION MANAGER OR AGENT

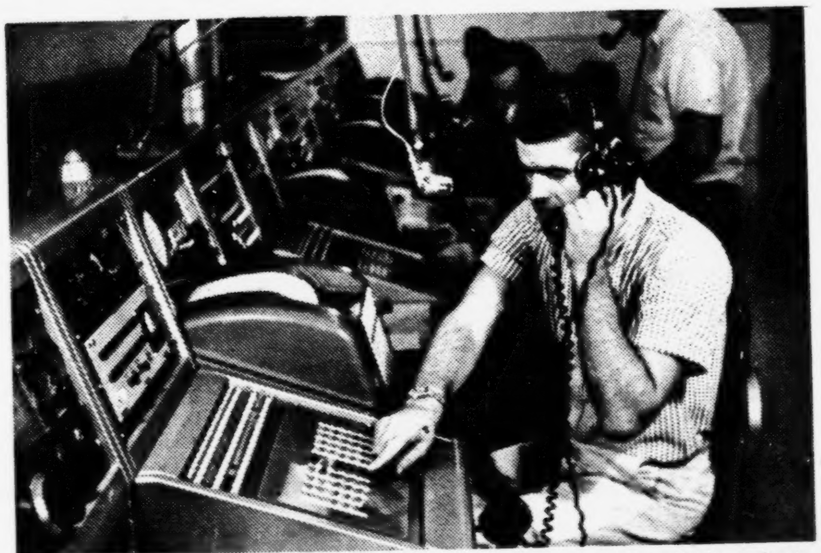
Nature of the Work. The Station Manager or Agent is responsible for all flight and ground operations for his airline at his airport — aircraft handling, passenger services, and air cargo operations. At a small station he may perform many of these services himself such as selling tickets, making public announcements, checking in baggage, moving portable stairs, preparing passenger and air cargo manifests, operating teletype machine, etc.

Working Conditions. He works in office at the airport. May sometimes work outdoors depending upon the size of the airport and his staff. Shift work is required during a forty-hour week.

Wages. Wages are from $600 to $1,400 per month, depending upon the size of airline.

GROUND RADIO OPERATOR

Nature of the Work. The Ground Radio Operator operates ground radio receivers and transmitters, sending messages to and receiving messages from pilots which he relays between the aircraft and the airline stations on all the airline's routes. Also relays messages to and from the flight dispatcher's office and FAA air traffic control towers and centers. May supervise automatic recording machines and transcribe their radio messages.



Air Transport Association photo

Ground radio operator connects airline operations office telephone lines with air and ground radio circuits.

Working Conditions. He works indoors at the airport in an airline operations office. Uses radio equipment. Shift work is required during a forty-hour work week.

Wages. Wages are from $450 to $600 per month, depending upon the size of airline.

Opportunities for Advancement. With a large airline, he may become the chief radio operator, supervising subordinates. He may work into a position as assistant flight dispatcher. A number of radio operator jobs are also available with ARINC, a cooperatively-owned airline radio communications system.

Requirements to Enter the Job. High school graduation with one or two years of additional technical training in radio operation and maintenance at a technical or vocational school offering such courses is required. Must have excellent hearing and enunciation, a third class FCC radio telephone or radio telegraph operators permit (second class permit is preferred). Military experience as a radio operator is very helpful in obtaining a job. Basic knowledge of meteorological phraseology and standard codes and symbols is necessary. And he must be able to type 40 words per minute.

TELETYPIST

Nature of the Work. The Teletypist operates teletype machines, sending messages, receiving them, and relaying them to proper departments and to other stations on the airline's routes. Also files messages as required.

Working Conditions. He works indoors at the airport in the airline's operations office or in other offices where teletype machines are used. Shift work is required during a forty-hour work week.

Wages. Wages are from $350 to $500 per month, depending upon size of airline.

Opportunities for Advancement. He may advance to a supervisory position.

Requirements to Enter the Job. A high school graduate is preferred. Additional training in teletype operations and procedures at schools offering such courses is preferred. The minimum typing speed is 40 words per minute. Needs to know codes and symbols used in airline communications. Both men and women are employed as teletypists.

Air cargo reservations agents must handle telephone inquiries and be familiar with many different air freight rates and flight schedules.

RESERVATIONS AGENT

Nature of the Work. The Reservations Agent handles telephone inquiries about complex flight schedules, fares, and connecting flights. He reserves seats and cargo space for customers. Operates computerized reservations equipment. Keeps records of reservations. Must be able to recommend services which fit customer's requirements and be familiar with routes and schedules of other airlines.

Working Conditions. He works indoors at the airport in the airline operations office. Shift work is required during a forty-hour work week. Work is interesting as no two calls are the same and many challenges occur as the employee works out the passenger's travel requirements.

Wages. Wages are from $375 to $650 per month, depending upon size of airline.

Opportunities for Advancement. He may advance to supervisor, monitoring employees' handling of inquiries, or to training positions. He may also be assigned to handle "executive accounts" or firms with large travel requirements, travel agents, international reservations, special "vacation packages" offered by the airline—jobs reserved for the more experienced and higher paid agents. May transfer to job of ticket agent. Reservations work is a principal route to a management position for the persistent worker, as turnover, due to shift work is high and promotion opportunities are frequently available.

Requirements to Enter the Job. Requirements include: high school graduation, 18-20 minimum years of age, with additional one or two years' training in airline operations at schools offering such courses, or experience in public telephone contact work preferred. Airlines offer on-the-job training. Accuracy and speed on the job are essential. Requires a good telephone voice, English usage, and the ability to "project" oneself over the phone. Air cargo reservations agents may be required to have some experience in shipping operations. Both men and women are employed.

TICKET AGENT

Nature of the Work. The Ticket Agent answers inquiries about flight schedules and fares. Verifies reservations by phone, figures fares, writes tickets, handles cash payments or credit card sales. May check in passenger's baggage, if the agent works at the air terminal ticket counter. Uses telephone and reservations computer equipment.

Working Conditions. He works at downtown or hotel airline ticket offices during business hours. Shift work is necessary, if employed at the airport ticket counters. Must wear a uniform.

Wages. Wages are from $375 to $650 per month, plus additional pay for late shift work.

Opportunities for Advancement. He may advance to the job of passenger service agent or station agent, chief of the ticket office, or to a job on the instructional staff. May also join the staff as sales representative. Women ticket agents may become ground hostesses. Superior employees are often considered for junior management training.

Requirements to Enter the Job. The minimum age varies from 18 to 20 years. Graduation from high school is a minimum requirement; however, two years of college is preferred, or the equivalent experience in dealing with the public. On-the-job training is offered. Good grooming, respect for accuracy, pleasant, courteous manner, and legible handwriting are important. Foreign language ability may be required by an international airline.

GROUND HOSTESS

Nature of the Work. The Ground Hostess assists passengers in the terminal with problems about flights such as: fares, lost baggage, missed connections, illness, and a need for wheelchairs.

Working Conditions. The work involves considerable standing and walking inside the air terminal. Shift work is required and a uniform must be worn.

Wages. Wages are from $415 to $657 per month.

Opportunities for Advancement. May advance to trainer, supervisor, or chief of counter sales positions.

Requirements to Enter the Job. The minimum age varies from 18 to 22 years. Graduation from high school is a minimum requirement. Some business experience or additional training in airline operations at schools offering such courses are sometimes required. On-the-job training is given. May be required to work at the ticket counter in the terminal, too. Foreign language ability is helpful at international airports. Women only are employed.

Eastern Airlines photo

SKYCAP

Nature of the Work. The Skycap helps passengers with baggage, answers questions about departures, arrivals, and terminal facilities. He assists passengers to and from taxis, buses, and cars. He may check in baggage at the terminal entrance.

Working Conditions. He works mostly indoors at the air terminal. Wears a uniform. Shift work is required. Lifts and carries heavy luggage and handles baggage hand carts in terminal.

Wages. Wages are from $325 to $415 per month, plus tips which could amount to as much as $10,000 depending upon the number of passengers using the terminal and the Skycap's helpful, outgoing nature.

Opportunities for Advancement. He may advance to the position of supervisor of Skycaps or to a sales representative.

Requirements to Enter the Job. A high school graduate is preferred. Minimum age is from 18 to 21 years. Must like to help people and be physically strong. On-the-job training. One airline fills this job from the ranks of ramp servicemen. At many air terminals Skycaps are employed by the airport rather than by the airlines.

AIR CARGO AGENT

Nature of the Work. The Air Cargo Agent receives air freight shipments, supervises loading and unloading, and keeps records. He handles contacts with air freight forwarders and customers.

Working Conditions. He works indoors in an office adjacent to the air freight terminal. Uses telephones and hand computers. Shift work is required.

Wages. Wages are from $375 to $650 per month. Some agents earn as much as $11,400 per year.

Opportunities for Advancement. He may advance to the position of ramp service planner, supervisor of air freight handlers, or to a position on the air freight sales staff or air cargo management staff.

Requirements to Enter the Job. A high school graduate with experience in shipping operations is preferred. He must like to work with details and records, and by physically strong.

Delta Air Lines photo

Passenger agent helps unaccompanied young passengers.

PASSENGER SERVICE AGENT

Nature of the Work. The Passenger Service Agent responds to abnormal conditions — passengers needing special assistance, over-sold flights, missed connections, heavy passenger concentrations — to expedite loading or unloading of passengers. He may also perform the duties of ticket agent and supervise the ticket office and handling of air mail.

Working Conditions. Wears uniform and works at the air terminal. Shift work is required. The variety of work is a desirable feature of this job.

Wages. Wages are from $375 to $650 per month.

Opportunities for Advancement. This job leads to a variety of managerial positions for qualified, dedicated workers. It is an excellent basis for subsequent training in sales, customers' services, or flight operations departments.

Requirements to Enter the Job. High school graduation is a minimum requirement. A thorough knowledge of flight schedules and ground services is necessary. On-the-job training is normally provided. He may be required to have a foreign language ability, if employed by an international airline. Experience as a ticket or reservations agent is helpful.

SALES REPRESENTATIVE

Nature of the Work. The Sales Representative calls on prospective customers and explains the advantages of airline service for travel and shipment of cargo. Stimulates business, vacation, and educational travel. Keeps in touch with travel agencies, firms, and educational institutions with potential for airline services, and with other airlines to increase interline sales. He may make hotel reservations for customers. A knowledge of flight and fare schedules is essential.

Working Conditions. He works regular business hours. Wears business clothing while making calls on customers.

Wages. Wages are from $500 to $1,000 per month.

Opportunities for Advancement. He may advance to position of district sales manager.

Requirements to Enter the Job. A college degree with courses in air transportation management is desired. An applicant who has completed military service is preferred. Must be aggressive, show initiative, be versatile, personable, and willing to relocate. The ability to express himself forcibly yet tactfully is necessary. Foreign language may be required by an international airline. Courses in psychology, public speaking, and salesmanship are helpful. A small number of women are employed as sales representatives. On-the-job training is provided. Note: Some airlines hire college students for training in sales promotion during summer vacation periods. On their return to the campus they become "campus representative" for the airline, contacting the many students and faculty members to acquaint them with the airline's special service and holiday opportunities. These part time jobs often lead to full-time employment in sales positions after graduation from college.

DISTRICT SALES MANAGER

Nature of the Work. The District Sales Manager is in charge of the city ticket and reservations sales offices in his area. He makes many contacts with people to promote air traffic and sales of airline seats and cargo space. Directs the activities of sales personnel.

Working Conditions. He works in a downtown office during regular business hours, but has to take advantage of many "after hour" opportunities to promote his airline by attending meetings and social affairs

Wages. Wages are from $600 to $1,400 per month.

Opportunities for Advancement. He may advance to a larger district with a corresponding increase in responsibilities and salary. He might work up to a top job as "Vice President-Sales".

Requirements to Enter the Job. This is not an entrance level job, as vacancies are almost always filled by moving employees upward through the ranks.

RAMP SERVICEMAN
(Interior of the Aircraft)

Nature of the Work. The Ramp Serviceman (Interior of the Aircraft) cleans the cabins between trips. He vacuums the floor, picks up trash, washes lavatories and buffets, replaces headrests and pillow covers, folds blankets, refills seat packets, refills drinking water supply, and cleans the cockpit windows.

Working Conditions. He works at a fast pace with cleaning equipment and supplies in cramped space with a team of workers. He must complete the job often with 10 or 15 minutes allowed before the plane must be ready to load passengers. Shift work. Must wear a uniform.

Wages. Wages are from $2.47 to $2.81 per hour, with extra pay for late afternoon and night shifts.

RAMP SERVICEMAN
(Exterior of the Aircraft)

Nature of the Work. The Ramp Serviceman (Exterior of the Aircraft) works on the exterior surfaces of the aircraft. He washes, polishes, touches up paint, and de-ices surfaces. He also works with chemicals to prevent corrosion of surfaces.

Working Conditions. He uses sponges, brushes, mops, and hoses. Works on scaffolding or in special lift equipment to reach high places. He usually works in a hangar but may sometimes be required to work outdoors.

The heaviest work schedules occur during night hours when most aircraft are not in service. Shift work is required and work is done frequently under pressure of time. Must wear a uniform.

Wages. Wages are from $2.01 to $2.81 per hour, with extra pay for late afternoon and night shifts.

RAMP SERVICEMAN
(Baggage and Air Cargo Handler)

Nature of the Work. The Baggage and Air Cargo Handler loads and unloads baggage, air mail, air express, and air cargo shipments. Drives baggage tow-carts, operates conveyors, fork lifts, fork trucks, and other baggage and air freight handling equipment. Operates machinery to sort and route baggage and air cargo to and from various flights.

Working Conditions. He works outdoors on noisy, crowded ramps, in all kinds of weather. Does much lifting and moving of baggage, mail sacks, and air express shipments and pushing and positioning of air cargo. Shift work is required and he must wear a uniform.

Wages. Wages are from $2.37 to $3.17 an hour, with extra pay for late afternoon and night shifts.

RAMP SERVICEMAN
(Aircraft Fueler)

Nature of the Work. The Aircraft Fueler operates the fueling equipment. He may drive a fuel truck, filling the truck with aviation fuel and delivering it to the aircraft. Operates fuel hose and pumps.

Working Conditions. He works outdoors with potentially hazardous aviation gasoline and kerosene in all kinds of weather. Shift work is required and he must wear a uniform. He may be required to climb and walk on wings of aircraft to reach fuel tank openings. Must observe strict safety rules.

Wages. Wages are from $3.00 to $3.75 per hour, with extra pay for special shifts.

RAMP SERVICEMAN (Driver)

Includes drivers of food trucks, mobile stairs, employees' buses, messenger cars, conveyors, cleaning equipment, aircraft air conditioning and power carts, etc.

Nature of the Work. These employees drive equipment to the aircraft and operate machinery, loading and off-loading food containers, galley units, and other kinds of equipment. They attach and detach ground air conditioning and power carts, move stairs, or drive employees' bus between airline facilities at the airport. They are usually on a regular work schedule.

Working Conditions. They wear uniforms and shift work is required. They work outdoors on noisy ramps in all weather conditions. Must use extreme care in positioning equipment near aircraft.

United Air Lines photo

Air cargo handlers operate machinery to move heavy loads of air freight inside the air cargo terminal.

OPPORTUNITIES FOR ADVANCEMENT — FOR RAMP SERVICEMEN

Depending upon the size of the airline and agreements with employees' unions, ramp servicemen may become leadmen and supervisors of crews in their own work areas — fuelers, cleaners, baggage and air cargo handlers, etc. Or they may start at the lowest paying jobs such as cleaners and work up to higher paying jobs, such as baggage handlers, drivers, and aircraft fuelers. With experience at a variety of ramp service jobs, workers with administrative abilities may be promoted to the job of a ramp planner.

REQUIREMENTS TO ENTER THE JOB — FOR RAMP SERVICEMEN

High school graduate, minimum age 18-21 years. Employees who drive trucks, buses, fork trucks, towing tractors, and similar equipment must have a driver's license and often a chauffeur's license as well. Good physical health and strength are required for baggage and air cargo handlers. Women are employed only for interior cleaning of aircraft. On-the-job training is given when new equipment is put into service or when better methods of accomplishing a job are developed.

CABIN MAINTENANCE MECHANIC

(Not to be confused with Airframe and Powerplant Mechanic described elsewhere in this GUIDE)

Nature of the Work. The Cabin Maintenance Mechanic cleans and paints interiors of aircraft during periodic major overhaul; removes and installs carpets, seats, curtains, and bulkheads; and re-upholsters seats. He overhauls and cleans electrical equipment in cabins, such as lights, buffets, and coffeemakers.

Working Conditions. He works in hangar shops using sewing machines for stiching upholstery and curtains. Uses tools associated with upholstery, rug laying, installation of seats, electrical maintenance of cabin service equipment, and sheet metal work. Works under pressure of time. Shift work is necessary and uniforms may be required.

Wages. Wages are from $550 to $675 per month.

Opportunities for Advancement. May advance to leadman, assistant supervisor of cabin maintenance, and then to supervisor.

Requirements to Enter the Job. High school graduate. Both men and women are employed in this job category. Women often work in upholstery shops, sewing seat covers and curtains. Technical or vocational school training in the various mechanical skills is usually required. Worker may specialize in one kind of job.

FOOD SERVICE EMPLOYEES

(Cooks, bakers, pantry, dining service, and kitchen service helpers)

Nature of the Work. The Food Service Employees prepare and cook food, following set recipes. Arrange silverware and dishes on serving trays and food items in serving dishes. Place food in either hot or refrigerated containers for pick up and delivery to the aircraft. Receive and clean soiled dishes.

Working Conditions. Works in a flight kitchen at the airport. Work must be completed according to flight schedules. The kitchen is a busy, noisy place. Shift work is required and uniforms must be worn.

Wages. Wages are from $2.48 to $3.33 an hour, plus extra pay for late afternoon and night shifts.

Opportunities for Advancement. May advance to position of pantry worker, steward chef, supervisor, chief chef, assistant buyer, or commissary chief, depending upon the type of beginning job.

Requirements to Enter the Job. High school graduate. Minimum age of 18-20 years. Both men and women are employed in flight kitchens. All workers must have health certificates and

respect for cleanliness and good housekeeping procedures. Chefs and cooks must have previous experience in food preparation. On-the-job training is given for all other kitchen workers.

RAMP PLANNER

Nature of the Work. The Ramp Planner keeps track of arriving aircraft and dispatches service units — cleaners, fuelers, baggage handlers, food service trucks, etc. Must know flight schedules.

Working Conditions. He works indoors at the airport. Uses charts, telephones, and teletype machines. Shift work is necessary. Works with a team of planners.

Wages. Wages are from $485 to $755 per month.

Opportunities for Advancement. He may advance to junior positions on the flight operations management staff or on the administrative staff of an airport director.

Requirements to Enter the Job. High school graduate. Minimum age of 20 to 25 years. Experience as a ramp serviceman is usually required. This is not an entrance level job.

AUTO MECHANIC

Nature of the Work. The Auto Mechanic services and repairs ground service equipment, such as portable stairs, fuel and food trucks, towing tractors, and employee buses.

Working Conditions. He works indoors in a garage or outdoors on the ramp, when required. He performs the duties usually associated with an auto mechanic. The normal work-week is forty hours.

ENGINEER

Nature of the Work. In line with his engineering specialty, the engineer works closely with aircraft manufacturers during the development of new models of airliners, to make sure the requirements of the airline are met as to performance, cabin plan, interior decorations, extra equipment, etc. He also designs improvements to aircraft and to methods of servicing and overhauling them.

Working Conditions. He works mainly indoors in an office, but duties often take him to hangars and maintenance shops for consultations and inspections. May travel frequently to aircraft manufacturing plants for consultation. He may be required to live in the area where the aircraft are being constructed; then he would travel to the airline headquarters.

Wages. Wages are from $650 to $1,200 per month.

Opportunities for Advancement. He may be advanced to a job directing the work of junior engineers or might work up to a top job of Vice President for Engineering or Maintenance.

Requirements to Enter the Job. A college degree with a major in an engineering field related to air transportation is required. Previous experience and a graduate degree are preferred.

AIRLINE MANAGEMENT TRAINEE

Nature of the Work. The Airline Management Trainee learns the airline business from the ground up, with short term assignments and on-the-job training in various departments, such as ticketing, air cargo, passenger service, and finance. The purpose of this training is to provide an employee with a well-rounded experience and with good potential for management duties.

Working Conditions. The trainee works in a variety of situations as he is moved from job to job. Most work is done indoors, but at times his assignment may require him to be outdoors. Shift work may also be required, depending upon his assignment.

Wages. Wages are from $500 to $670 per month.

Opportunities for Advancement. He has excellent opportunities for advancement to managerial positions, in time. The educational background required for his selection as a management trainee, plus his intensive on-the-job training in many areas of airline operation hold promise for many opportunities to above-the-average level jobs with the airline.

Requirements to Enter the Job. A college degree with a major in air transport management is required. His college record must demonstrate leadership ability by participation in sports or other student activities. Must be willing to relocate.

ADMINISTRATIVE PERSONNEL

In addition to the jobs described in the foregoing, airlines employ thousands of receptionists, typists, secretaries, stenographers, mail and file clerks, and computer personnel, as well as people in managerial positions such as training, public relations, publications, finance, personnel, and other kinds of work associated with business and industry. Salaries paid are generally above the average paid by industry and business.

OUTLOOK FOR THE FUTURE

The air transportation industry is young and vigorous. It is the fastest growing industry in the U.S. Over the past five years its growth has averaged 15 per cent. Its present rate of growth is three times that of the Gross National Product and twice the rate of the second fastest growing industry — electric utilities. From 1955 to 1965, airline travel doubled in volume; it is expected to double again in the next ten years. Present air cargo operations will triple by 1971.

Responsible sources all predict continuation of this upward, rapid growth trend — a position the airlines themselves support as, over the next ten years, they will spend $18 billion for new jet equipment and ground facilities to handle the soaring volume of air traffic in the 1970's. In 1966 the U.S. airline industry employed more than 275,000 people. An additional 30,000 people were hired in 1967, representing a 13 per cent increase over the previous year. One major airline alone needs a steady flow of applicants over the next two years in the following employment areas:

Stewardesses — 2,500 (and expected to increase)
Mechanics, Base and Line — 2,300
Public Contact Personnel (reservations, passenger service, customer services, ticket sales agents, etc.) — 1,800
Flight Officers — 800
Professional and technical (engineers, programmers, etc.) — 400
Dining Service Workers, clerical workers, and all others — 3,000

To accomplish this hiring program and to take care of normal attrition, the airline estimates it will have to screen, interview, test, or otherwise have contact with about 460,000 applicants before 1970.

Larger aircraft such as the jumbo jets carrying 300 to 400 passengers are scheduled to begin flying in 1969. Increases in sales forces will be required to stimulate the sale of passenger seats and cargo space offered by these super-size aircraft. Flight kitchens will have to be enlarged to provide more meals for increased numbers of passengers, and this will require more kitchen workers. More personnel will be needed to clean and service the larger aircraft within the allotted time. While computerization of reservations and ticketing procedures may slow the rate of increase in the number of employees in these areas, replacements will be required to take care of normal turnover and some additional workers will be needed to service the expected increase in business.

This rapid growth provides unusual opportunities for employment, and especially for recognition of employee ability with prospects for rapid advancement. Airline employment policy puts the accent on youth. That policy, coupled with the practice of promotion from within the company, offers thousands of excellent opportunities for ambitious young people who want to be associated with a glamorous, forward-looking, dynamic industry.

WHERE TO OBTAIN FURTHER INFORMATION—About Airline Careers. (Be sure to be as specific as possible when making each request.)

Air Line Dispatcher's Assoc. 243 W. Maple Ave. Vienna, Virginia 22180	The Dispatcher . . . Airline Safety and Economy in the Jet Age. Booklet describing the job of an airline dispatcher. Free.
Air Transport Association 1000 Connecticut Ave., N.W. Washington, D.C. 20036	Career Opportunities with the Airlines. A brief summary. Includes names and addresses of U.S. scheduled airlines.
American Airlines c/o General Office Supervisor-Personnel 633 Third Avenue New York, New York 10017	Key to An Exciting Career. Booklet discussing employee qualifications for pilots, stewardesses, mechanics, reservations sales personnel, manager trainees, data processing personnel, engineers and clerical employees. Free.
American Airlines Attn: Manager, Executive Recruitment 633 Third Avenue New York, New York 10017	Visibility Excellent—Opportunities Unlimited. Booklet discussing management-trainee opportunities. Free.
Careers P. O. Box 135 Largo, Florida 33540	Airline Dispatchers, No. 125B. 25 cents. Airline Ticket Agent, No. 191S. 15 cents. Airline Clerical Jobs, No. 43B. 25 cents.
Chronicle Guidance Publishers Moravia, New York 13118	Air Transportation Occupations. No. 380. A 4-page occupational brief covering various airline careers. 35 cents. Dispatcher (air trans.) No. 267. 4-page brief discussing work of airline dispatcher. 35 cents.
National Air Carriers Association 1625 Eye St., N.W. Washington, D.C. 20006	Brochure listing names and addresses of supplemental airlines. Free.
Pan American World Airways Educational Service Pan Am Building New York, N. Y. 10017	Career Information. Discusses employment opportunities with PAA with summaries of training and experience required. Free.
Supt. of Documents U.S. Government Printing Office Washington, D.C. 20402	Occupational Outlook for Civil Aviation. Bulletin 1450-96. 15 cents.
United Air Lines Employment Office O'Hare Field Station - P.O. Box 8775 Chicago, Ill. 60666	Join the Friendly Skies of United Air Lines. A booklet describing entry job classifications, benefits, qualifications, etc. Free.

CLASSES OF UNITED STATES COMMERCIAL AIR CARRIERS

There are nine generally recognized classes of operators in the air transport industry of the United States. These classifications are used by the Civil Aeronautics Board in connection with the economic regulation of the industry and under the Federal Aviation Act are based largely on the scope of operations authorized or allowed by that Act. Classes One to Seven have certificates of convenience and necessity authorizing them to conduct regularly scheduled services.

1. **The Domestic Trunk Carriers** include those carriers which presently have permanent operating rights within the continental United States. There are currently eleven trunk lines, most of which operate high-density traffic routes between the principal traffic centers of the United States.

American
Braniff International
Continental
Delta
Eastern
National
Northeast[1]
Northwest
Trans World
United
Western

2. **The Domestic Local Service Carriers** have, with one exception, been certificated since 1945. These carriers, thirteen in number, operate routes of lesser traffic density between the smaller traffic centers and between these centers and principal centers.

Allegheny
Bonanza %
Central *
Frontier *
Lake Central
Mohawk[1]
North Central[1]
Ozark
Pacific %
Piedmont
Southern
Trans-Texas[1]
West Coast[1] %

3. **The Intra-Hawaiian Carriers** operate between the several islands comprising the State of Hawaii.

Aloha
Hawaiian

4. **The Intra-Alaskan Carriers** provide service within the State of Alaska.

Alaska Coastal
Cordova #
Kodiak
Howard J. Mays[2, 3]
Northern Consolidated
Reeve Aleutian
Wein Air Alaska
Western Alaska

5. **The Helicopter Carriers** presently operate between airports, central post offices, and suburbs of New York, Chicago, Los Angeles and San Francisco. Originally certificated as exclusive mail carriers they now fly passengers, air freight and air express, in addition to U. S. Mail.

Chicago Helicopter Airways[3]
Los Angeles Airways
New York Airways
San Francisco & Oakland Helicopter Airlines[4]

6. **The International and Territorial Carriers** include all U.S.-Flag air carriers operating between the United States and foreign countries other than Canada, and over international waters. Some of these carriers conduct operations between foreign countries and some are extensions of domestic trunk lines into Mexico and the Caribbean and to Alaska and Hawaii.

Alaska #
American
Braniff International
Caribbean Atlantic
Delta
Eastern
National
Northwest
Pacific Northern **
Pan American
Trans Caribbean
Trans World
United
Western **

7. **The All-Cargo Carriers** operate scheduled flights carrying freight, express and mail between designated areas in the U.S., and in one case to the Caribbean and in another to Europe.

Aerovias Sud Americana[3]
Airlift International
Flying Tiger
Seaboard World
Slick[3]

8. **Supplemental Air Carriers.** A class of air carriers now holding certificates issued by the CAB authorizing them to perform passenger and cargo charter services, supplementing the scheduled service of the certificated route air carriers. As of March 1, 1967, there were 13 such companies. Statistical data of these carriers are not included herein.

9. **Intra-state Air Carriers.** A class of air carriers operating as intra-state common carriers, whose operations are limited to an area within the boundaries of a particular state, and whose operating authority is granted by the Aviation or Transportation Board of Control of that state. Statistics for this carrier group are not included in this report.

10. **Others.** Among other classes of operators are the air taxi operators and air freight forwarders. Air taxi operators are a class of air carriers operating light aircraft up to a gross weight of 12,500 lbs., and engaging in a wide variety of passenger and/or cargo transportation services, with no necessarily fixed routes. Air freight forwarders are classified as indirect air carriers and are engaged in the assembly and consolidation of cargo for transportation by a direct air carrier. There are approximately 120 forwarders operating in domestic interstate and foreign and overseas commerce. Statistical data for these groups of carriers are not included herein.

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[1] Also certificated to provide trans-border service.

[2] Certificated non-mail carriers.

[3] Scheduled services temporarily suspended.

[4] Certificated to carry persons, property and mail at a service rate.

* Central and Frontier have merged under the name FRONTIER AIRLINES
** Western and Pacific Northern have merged under the name WESTERN AIRLINES
% Approval for merger among Bonanza, Pacific, and West Coast Airlines into AIR WEST is pending
# Alaska and Cordova have merged under the name ALASKA AIRLINES

CHAPTER SIX

Airline Stewardesses or Stewards

GENERAL INFORMATION

Stewardesses, or flight hostesses, and stewards are employed to make the airline passengers' flight as comfortable and as enjoyable as possible. The majority of those hired by U. S. airlines are stewardesses; therefore, this description will concentrate on information for women. It should be noted, however, that the duties and working conditions are substantially the same for stewards as for the stewardesses. The opportunities for employment are small for stewards as only some international airlines employ young men as stewards. Foreign airlines employing stewards normally hire their own nationals.

Nature of the Work. The chief duties of a stewardess are as follows:

1. Preflight Duties
   - a. Attends preflight briefings by the captain to learn about expected weather conditions, special passenger problems, etc.
   - b. Checks passenger cabin and galleys before passengers board to see that all supplies, equipment, and food are aboard and in place.
   - c. Greets and directs passengers to their seats, assists mothers with young children, and the elderly or handicapped.
   - d. Helps passengers stow hand luggage and coats.
   - e. Checks seat belts and observance of "No smoking" signs.
   - f. Makes announcements over public address system regarding weather, altitude, estimated flight time, etc.
   - g. Demonstrates use of safety equipment.
2. Inflight Duties
   - a. Distributes reading material, pillows, and blankets to passengers requesting them.
   - b. Serves refreshments and meals to passengers and crew.
   - c. Gives first aid to uncomfortable or ill passengers.
   - d. Answers passengers' questions and assures the apprehensive traveler.
   - e. Takes special care of unaccompanied children.
   - f. On air shuttle flights, sells tickets.
   - g. Copes with emergency conditions.
   - h. Announces arrival of flight, time on the ground before departure, etc.
   - i. Stands at cabin door and bids passengers goodbye.
3. Postflight Duties
   - a. Makes necessary reports such as minor medication given to passengers, lost and found articles, cabin and equipment conditions needing attention, and numerous other matters that may require reporting.
   - b. If required by the airline, may do some housekeeping chores such as folding blankets, wiping off the buffets, straightening curtains, etc.

In addition to flight duties, stewardesses are sometimes called upon to make public relations appearances for the airlines during Career Days at high schools, at United Givers Fund campaigns, at sales meetings, conventions, and other goodwill occasions.

Working Conditions. A stewardess' regular place of work is in the passenger cabin of an

United Air Lines photo

World's first airline stewardesses—1930.

airliner. She flies from 80 to 85 hours a month. In addition, she has about 35 hours a month ground duty. She must be present for the captain's briefing at least an hour before flight time. At the end of the flight she has reports to complete. Her total monthly working time, in most cases, is determined by agreements between the airline and her union.

The stewardess' working day has irregular hours and is determined by the flight to which she is assigned. If her flight leaves at 5 a.m., she is expected to report to her captain by 4 a.m. The maximum number of flying hours per day is also set by union agreement and ranges from 12 to 16 hours. Under this arrangement she can accumulate her maximum hours rather quickly, and so her flight assignments are spread out over the month, giving her consecutive days off. Over a year's time, this averages about 156 days off, not counting partial days off before and after trips. (The average office secretary has 96 days off and full working days the rest of the time.) The stewardess frequently works at night and on weekends and holidays, when travel is heavy. She may choose (or bid for) flights, but her final assignment is determined by her seniority. The longer she is employed, the higher her seniority, and the more likely she is to work on the flights of her choice.

Her flight assignments usually require overnight stays in cities away from her home base. Under these circumstances she is given a travel allowance for good hotel accommodations and meal expenses, transportation, and incidentals.

Stewardesses are required to buy a uniform and wear it while on duty. The uniform is made to measure, and is designed by top names in the fashion world to look like a coordinated, stylish wardrobe, rather than a work-a-day uniform. Usually a small monthly allowance is given by the airline to cover cleaning and upkeep of uniforms.

The stewardess' inflight duties require her to be on her feet most of the time. She frequently works at top speed to accomplish all the tasks that must be done within the few hours of flight. At times she must serve meals and pour coffee under rough or uncomfortable flying conditions. She must deal pleasantly with all kinds of people, some of whom can be most annoying and demanding.

Depending upon her seniority, she may be under the direction of a senior stewardess, or she may direct the work of a junior stewardess. She may be required to give elaborate service to a small number of first class passengers, or less elaborate but substantial service to a larger number of tourist-class passengers.

Where the Jobs Are. Stewardesses are employed by every airline and are based, or "domiciled", at major stations along the airline's routes and at the airline's headquarters city. In general, stewardesses work out of major airline centers such as New York, Los Angeles, Miami, Chicago, San Francisco, Denver, Atlanta, Washington, D. C., Kansas City, Boston, Detroit, and Seattle.

Wages and Benefits. The starting base salaries range from $175 per month to $441 per month, depending upon the size of the airline and (in most cases) union negotiations. Maximum base salaries range from $320 to $720

Faustino photo

Classroom study occupies a major portion of stewardess training courses.

per month. Salary increases are given at regular six-month and/or twelve-month intervals.

Usually a basic guaranteed monthly salary is paid for a minimum number of flight hours ranging from 65 to 85, depending upon union agreements. For every hour flown above the minimum guarantee, extra incentive payments are made on an hourly basis. For example, a stewardess may be paid the guaranteed $325 for 70 hours of flight, but if within the month she flies 77 hours, she will receive an additional $4.50 an hour for each of the seven hours flown above the minimum of 70. Stewardesses on international flights usually earn higher salaries than those on domestic flights.

The majority of stewardesses are represented by one of the following unions:

Air Line Pilots Association/Stewardess and Steward Division
Air Line Stewards and Stewardesses Association, International
Transport Workers Union of America, Air Transport Division

A stewardess has the same benefits that other airline employees enjoy such as paid vacation and sick leave, free travel for herself and immediate family, paid medical and life insurance, retirement plans, credit unions, employee suggestion plans with cash awards, and reduced air fares on other airlines. With the time and low fares at her disposal, she can afford to vacation almost anywhere in the world. In addition, the stewardess enjoys the good opinion of the general public who looks upon her as an attractive, mature personality with a glamorous job.

American Airlines photo

Living quarters for stewardess candidates.

Opportunities for Advancement. After successfully completing the training course, the new stewardess begins work on a probation basis for six months. During this time she is on call to work on extra flights or as a replacement for stewardesses who are ill or on vacation. Her work is observed and directed by a senior stewardess. In time, she can become a Senior Stewardess, directing other stewardesses on her flight. Also, she may work up to the position of Supervising Stewardess, Stewardess Instructor, or Chief Stewardess. Whenever she resigns as a stewardess she may be considered for positions as a reservations or ticket sales agent, or work in public relations, or personnel recruiting, depending upon her qualifications for these positions.

Advancement as a stewardess is rapid as the turnover is high. The average stewardess resigns for various reasons within two years of entering the job. Her experience as a stewardess qualifies her for numerous jobs where contact with the public is involved.

Requirements to Enter the Job.

1. Physical: Entry age range is 19-27 years; Height 5'0" to 5'9"; Weight in proportion to height; Vision 20/20 correctable with contact lenses that can be worn comfortably for twelve hours or more; Good physical health and the ability to pass a thorough physical examination; Flawless complexion, good posture, even teeth, pleasant smile, and natural hair style.

2. Personality: Poised, mature, emotionally stable, outgoing, and a good conversationalist.

3. Marital Status: Single girls are overwhelmingly preferred, but a few airlines are beginning to accept widows and divorcees provided they have no children and can qualify otherwise. A few airlines will allow stewardesses to retain their jobs if they marry after they have passed the probation period.

4. Education: High school graduation is a minimum. Most airlines prefer at least two years of college or business experience involving public contact. Many stewardesses are college graduates.

5. Other: Good English usage is required. A clean and wholesome rather than a glamorous appearance is desired. Airlines with international routes usually require fluency in one or more foreign languages such as French, Spanish, and German.

FISK UNIVERSITY
TENNESSEE
OREGON
COLORADO STATE UNIVERSITY
CONNECTICUT
FLORIDA STATE
BOWLING
OHIO STATE
SAN JOSE
SANTA BARBARA
WASHINGTON

United Air Lines photo

College coeds return to school after spending a summer as stewardesses. Jobs with the airline will be waiting for them when they graduate.

Airlines have varying standards. If an applicant is not accepted by one airline, her qualifications may still be accepted by another. Girls who are interested in the career of an airline stewardess should contact several air carriers.

Opportunities for Training. Airlines operate stewardess training programs on a continuing basis, or as needed. The larger airlines have elaborate stewardess colleges with campus-like facilities and a carefully chaperoned boarding school atmosphere. Among the airlines, training periods range from two weeks to six and a half weeks (the average is four weeks). Trainees learn about the theory of flight, the parts of an airliner and their functions, airline language, air traffic control, emergency and safety procedures, first aid, airline routes and regulations, serving methods, and a host of other details related to their work and to the air transport industry in general. The most popular course is personal grooming where the students are advised about makeup, hair styling, posture, and weight control. Board, room, and school supplies are provided free, or payments are made to cover these costs. Free air transportation is provided from the trainees' homes to the school. The dollar value of stewardess training can be as much as $2,000 per student.

Some private schools offer stewardess training that may give a candidate some advantage.

However, airlines will insist that such trained candidates still need to complete the airlines' stewardess training program. Therefore, it is advisable for the candidate to check with the airline of her choice for its policy regarding prior training. (See below for the locations of airline stewardess training schools.)

Outlook for the Future. Based on a survey just completed by the National Aerospace Education Council, 32 responding U. S. airlines indicated that the median length of employment is 21 months, reflecting the strenuous work and the demands for constant travel associated with the occupation of stewardess. The demand for stewardesses is expected to continue because of an annual turnover of about 27 per cent of the 18,000 stewardesses currently employed. Five thousand stewardesses a year are needed just for replacements. Additional stewardesses will be required each year to serve on new aircraft added to the fleet or to serve on the jumbo jets joining the airline fleet within the next two years. These huge new planes will require up to 14 stewardesses per flight instead of the usual three or four today. The NAEC survey also revealed that the 32 responding airlines' hiring schedules range from a total of 10,400 stewardesses to be hired in 1968 to 13,100 in 1970. In 1975, one major airline expects to have 9,000 stewardesses on its payroll, or double its present number. They plan to train 3,300 annually.

The airlines now interview about 25 girls to find one promising trainee. Hundreds of thousands of young women will have to answer the stewardess recruiter's call to fill the expected job openings in the years ahead.

LOCATIONS OF U.S. AIRLINE STEWARDESS TRAINING SCHOOLS
(Based on airlines responding to NAEC's Stewardess Survey of October 1967)

Airline	Location
Alaska Airlines	Seattle, Washington
Alleghany Airlines	Pittsburgh, Pennsylvania
Aloha Airlines	Honolulu, Hawaii
American Airlines	Fort Worth, Texas
American Flyers Airline	Ardmore, Oklahoma
*Bonanza Air Lines	Phoenix, Arizona
Braniff International	Dallas, Texas
Capitol International Airways	Wilmington, Delaware
Delta Air Lines	Atlanta, Georgia
Eastern Airlines	Miami Springs, Florida
Frontier Airlines	Denver, Colorado
Hawaiian Airlines	Honolulu, Hawaii
Lake Central Airlines	Indianapolis, Indiana
Mohawk Airlines	Utica, New York
North Central Airlines	Minneapolis, Minnesota
Northeast Airlines	Boston, Massachusetts
Northwest Orient Airlines	Minneapolis, Minnesota
Overseas National Airlines	Jamaica, New York
Ozark Air Lines	St. Louis, Missouri
*Pacific Air Lines	San Francisco, California
Pan American World Airways	Miami, Florida
Piedmont Airlines	Winston-Salem, North Carolina
Purdue Airline	Lafayette, Indiana
Reeve Aleutian Airways	Anchorage, Alaska
Saturn Airways	Oakland, California
Trans International Airlines	Oakland, California
United Air Lines	Chicago, Illinois
Universal Airlines	Seattle, Washington
Western Airlines	Los Angeles, California
Wien Air Alaska	Fairbanks, Alaska

*Approval of a merger among Bonanza, Pacific, and West Coast Airlines into AIR WEST is pending.

NOTE: Thirty-two airlines responded to NAEC's stewardess survey; 31 are listed above and one airline (Caribbean Atlantic) does not have a stewardess training school.

WHERE TO OBTAIN FURTHER INFORMATION—about airline careers. (Be sure to be as specific s possible when making each request.)

Air Line Pilots Association/Steward and Stewardess Division 55th St. and Cicero Ave. Chicago, Ill. 60638	For general information about stewards and stewardesses.
Air Line Stewards and Stewardesses Association 205 W. Wacker Drive, Suite 1219 Chicago, Ill. 60606	For information about stewards and stewardesses.
Air Transport Association 1000 Connecticut Ave., N. W. Washington, D. C. 20036	List of member airlines and their addresses. Free.
American Airlines General Office Supervisor--Personnel 633 Third Ave. New York, N. Y. 10017	Career booklet. Wing Your Way to a Career in the Sky with America's Leading Airlines--American Airlines. Free.
Careers Box 135 Largo, Florida 33540	Career brief. Airline Stewardess. No. B-16R. 25 cents.
Chronicle Guidance Publishers Moravia, New York 13118	Occupational brief. Airplane Stewardess. No. 41. 35 cents.
Pan American World Airways, Inc. Personnel Office Pan Am Building New York, N. Y. 10017	Free brochure. Job Opportunities with Pan Am.
Science Research Associates 259 E. Erie St. Chicago, Ill. 20611	Occupational brief. Airline Stewardesses. No. 120. 40 cents.
Transport Workers Union of America Air Transport Division 1980 Broadway New York, N. Y. 10023	General information about airline stewardesses.
Trans World Airlines 605 Third Ave. New York, N. Y. 10016	Reprint from Ingenue Magazine, "Airline Hostess: A Job in the Clouds". Free.
United Air Lines Personnel Office Box 8775 O'Hare International Airport Chicago, Illinois 60666	Free brochure. Interesting places, interesting people, a more interesting you.

CHAPTER SEVEN

Aviation Careers in Government

GENERAL INFORMATION

A major source of aviation careers lies in jobs with federal, state, and local government agencies. Local government agencies (county or city) usually are related to airport operations and jobs in this category are described elsewhere in the GUIDE.

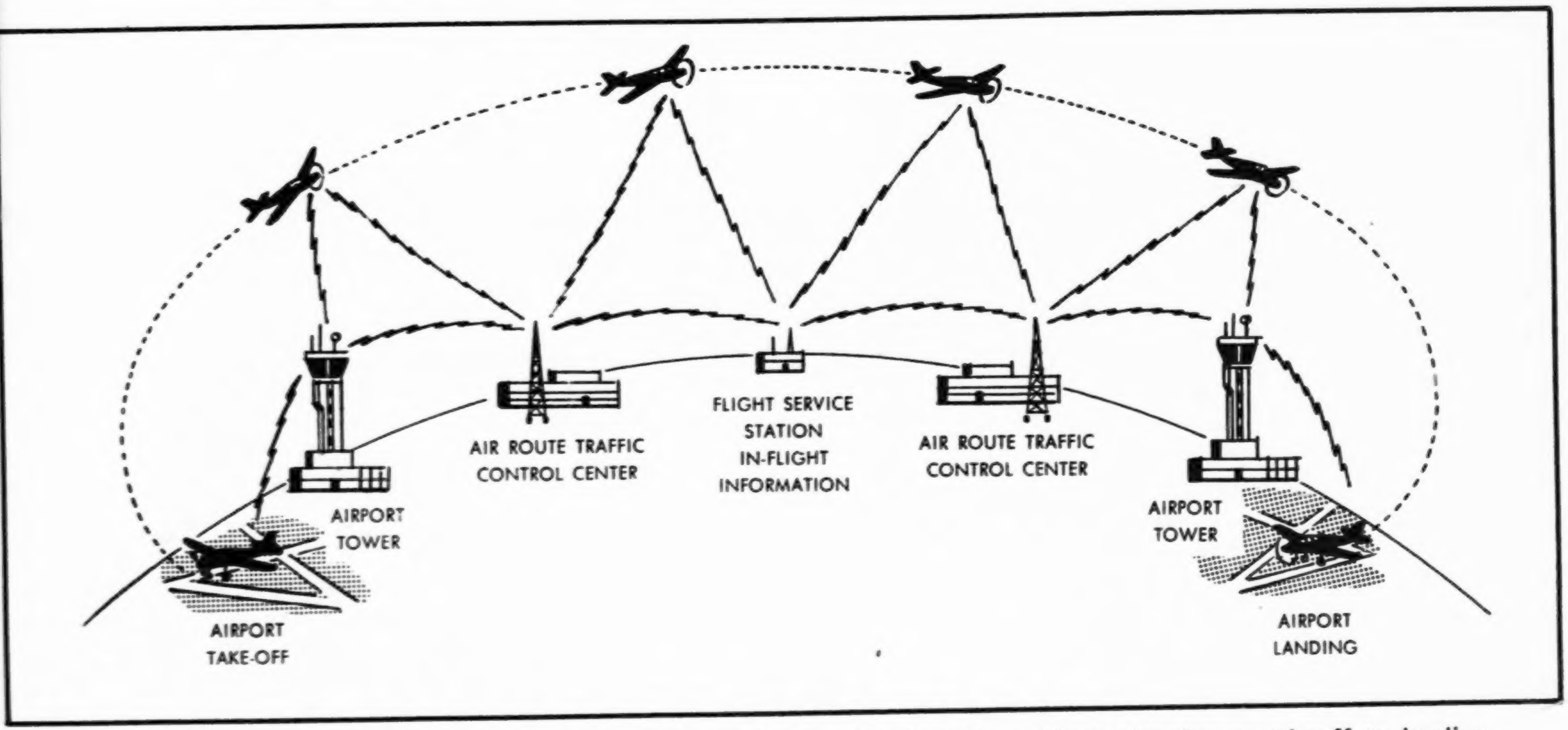
Civil aviation careers in the federal government for both men and women are found within the Department of Transportation, Federal Aviation Administration; the Civil Aeronautics Board; and in a growing number of other federal departments and agencies. Civilians are also employed in aviation jobs by the military services. All of these aviation jobs come under the Federal Civil Service, and wage scales are determined by Congress, which, from time to time, raises the pay levels to bring them in line with comparable jobs in private business and industry. Salaries for Federal Civil Service employees are established into two chief categories: General Schedule (for those employees who perform administrative, managerial, technical, clerical, and professional jobs and who are paid on an annual basis) and Trades and Labor, formerly "Wage Board", (for those employees who perform jobs associated with the trades and crafts and who are paid wages on an hourly basis).

Most Federal Civil Service employees in the aviation field are covered by the General Schedule and their salaries vary according to their grade level (GS-1 through GS-18). Within each of the grades provided in the General Schedule, provision is made for periodic pay increases based on an accepted level of performance. With acceptable level of competence, the waiting period of advancement to steps 2, 3, and 4 is one year; steps 5, 6, and 7 is two years; steps 8, 9, and 10 is three years. The present Federal Civil Service classified pay rates, for the General Schedule, are contained in the tables on page 85.

Forty hours constitutes a normal work-week. Additional payment is made for shift work involving duty between 6 p.m. and 6 a.m., and for work during Sundays and holidays. Merit promotions are awarded under provisions of a Civil Service approved merit promotion plan.

Most federal employees under Civil Service participate in a very liberal retirement plan. Employees earn from 13 to 26 days of paid annual vacation, depending upon the length of service, and 13 days of paid sick leave each year. Health insurance, low-cost group life insurance, credit union service, and compensation and medical care for injury on the job are other benefits offered.

The largest number of aviation jobs found within the federal government is with the Federal Aviation Administration (FAA) of the Department of Transportation. The FAA, with a total of about 45,000 employees, is charged with the administration and enforcement of all federal air regulations to assure the safety of air transportation. The FAA also promotes, guides, and assists the development of a national system of civil airports. The FAA provides pilots with



Air traffic control towers, centers, and flight service stations assist pilots from flight planning to takeoff to landing.

flight information from flight planning to takeoff to landing.

Major career fields within FAA are: air traffic control specialists, electronic technicians, aviation safety officers, pilots, and engineers. Descriptions of these FAA careers follow.

AIR TRAFFIC CONTROL SPECIALIST (FAA)
at FAA airport traffic control tower

Nature of the work. The Air Traffic Control Specialist at FAA airport traffic control towers directs air traffic so it flows as smoothly as possible. He gives pilots taxiing and takeoff instructions, air traffic clearances, and advice based on information received from the Weather Bureau, air route traffic control centers, aircraft pilots, and other sources. He transfers control of aircraft on instrument flights to the Air Route Traffic Center (ARTC) controller when the aircraft leaves his airport control area and receives from ARTC control of aircraft on instrument flights flying into his airport control area. He operates runway lighting systems and airport traffic direction indicators and prepares reports on air traffic and communications. He must be able to recall quickly registration numbers of aircraft under his control, their types and speeds, positions in the air, and also the location of navigational aids in his area and distances between them.

Working Conditions. He works a forty-hour week in FAA control towers at airports, using radio, radar, telephone, traffic control light, and other devices for communication. Shift work is involved. Each controller is responsible, at separate times, for: giving taxiing instructions to aircraft on the ground, takeoff instructions and flight clearances, or directing landings of incoming planes. These individual duties are rotated among the staff about every hour or two hours at busy locations. At busy airports controllers must work at top speed. Tension often builds up as traffic mounts, especially when poor flying conditions occur and traffic stacks up. Brief rest periods provide some relief, but are not always possible. Radar controllers must work at times in semi-darkness, as well as in rooms with normal lighting.

Where the Jobs Are. FAA employs 6,963 controllers in airport control towers located at 338 airports (as of January 1, 1968) scattered throughout the nation, mostly in areas having moderate to heavy air traffic. A few towers are located outside the continental United States in Alaska, Hawaii, Puerto Rico, and the Virgin Islands. Employees are subject to relocation to meet staffing requirements.

Wages. The starting grade is GS-6, at $6,137 per year. Trainees are paid while learning their jobs. The highest grade for an operating pro-

FEDERAL CIVIL SERVICE CLASSIFIED PAY RATES (GENERAL SCHEDULE)

Grade	1	2	3	4	5	6	7	8	9	10
GS-1	$3,776	$3,902	$4,028	$4,154	$4,280	$4,406	$4,532	$4,658	$4,784	$4,910
GS-2	4,108	4,245	4,382	4,519	4,656	4,793	4,930	5,067	5,204	5,341
GS-3	4,466	4,615	4,764	4,913	5,062	5,211	5,360	5,509	5,658	5,807
GS-4	4,995	5,161	5,327	5,493	5,659	5,825	5,991	6,157	6,323	6,489
GS-5	5,565	5,751	5,937	6,123	6,309	6,495	6,681	6,867	7,053	7,239
GS-6	6,137	6,342	6,547	6,752	6,957	7,162	7,367	7,572	7,777	7,982
GS-7	6,734	6,959	7,184	7,409	7,634	7,859	8,084	8,309	8,534	8,759
GS-8	7,384	7,630	7,876	8,122	8,368	8,614	8,860	9,106	9,352	9,598
GS-9	8,054	8,323	8,592	8,861	9,130	9,399	9,668	9,937	10,206	10,475
GS-10	8,821	9,115	9,409	9,703	9,997	10,291	10,585	10,879	11,173	11,467
GS-11	9,657	9,979	10,301	10,623	10,945	11,267	11,589	11,911	12,233	12,555
GS-12	11,461	11,843	12,225	12,607	12,989	13,371	13,753	14,135	14,517	14,899
GS-13	13,507	13,957	14,407	14,857	15,307	15,757	16,207	16,657	17,107	17,557
GS-14	15,841	16,369	16,897	17,425	17,953	18,481	19,009	19,537	20,065	20,593
GS-15	18,404	19,017	19,630	20,243	20,856	21,469	22,082	22,695	23,308	23,921
GS-16	20,982	21,681	22,380	23,079	23,778	24,477	25,176	25,875	26,574	
GS-17	23,788	24,581	25,374	26,167	26,960					
GS-18	27,055									

Present legislation provides for increases in pay, to the rates indicated above, July 1, 1968 and July 1, 1969.

FEDERAL CIVIL SERVICE INCREASES ABOVE-THE-SCALE PAY RATES FOR ENGINEERS, CERTAIN PHYSICAL SCIENTISTS AND MATHEMATICIANS

	PER ANNUM RATES									
Grade	1*	2	3	4	5	6	7	8	9	10
GS-5	$7,239	$7,425	$7,611	$7,797	$7,983	$8,169	$8,355	$8,541	$8,727	$8,913
GS-6	7,982	8,187	8,392	8,597	8,802	9,007	9,212	9,417	9,622	9,827
GS-7	8,759	8,984	9,209	9,434	9,659	9,884	10,109	10,334	10,559	10,784
GS-8	9,106	9,352	9,598	9,844	10,090	10,336	10,582	10,828	11,074	11,320
GS-9	9,668	9,937	10,206	10,475	10,744	11,013	11,282	11,551	11,820	12,089
GS-10	10,291	10,585	10,879	11,173	11,467	11,761	12,055	12,349	12,643	12,937

* Corresponding statutory rates: GS-5—Tenth; GS-6—Tenth; GS-7—Tenth; GS-8—Eighth; GS-9—Seventh; GS-10—Sixth.

essional (journeyman) air traffic control specialist in the tower is GS-12 ($11,461 to $14,899 per year).

Opportunities for Advancement. Promotion from trainee to higher grades as assistant controller and professional controller depends upon the employee's performance and satisfactory achievement in his training program. Increases in grade (with accompanying increases in salary) are fairly rapid, but grades above GS-12 are for positions of watch supervisor, staff officer, and chief. During the first year, the trainee-controller is on probation and then he may advance from positions backing up professional controllers to primary positions of responsibility. It takes a trainee-controller from 3-1/2 years (minimum) to about six years of experience to reach the professional level. Professional controllers are selected for research activities with FAA's National Aviation Facilities Experimental Center at Atlantic City. Some are also selected to serve as instructors at the FAA Academy at Oklahoma City.

Requirements to Enter the Job. He should be at least 21 years of age and be able to obtain a Second Class FAA medical certificate. He must be free from color blindness. One of the following is also required:

Four years of college with a bachelor's degree.
Three years of responsible work experience.
Instrument flight rating.
Air traffic control facility rating.
Airline dispatcher certificate.
FAA navigator certficate.
Experience as an air traffic controller in the military service.

Applicants must also pass a two-hour written test and a personal interview during which alertness, decisiveness, diction, poise, and conciseness of speech are evaluated. A small number of women (40) are employed presently as air traffic controllers at Control Centers. Few occupations make more rigid physical and mental demands upon employees than that of an air traffic controller.

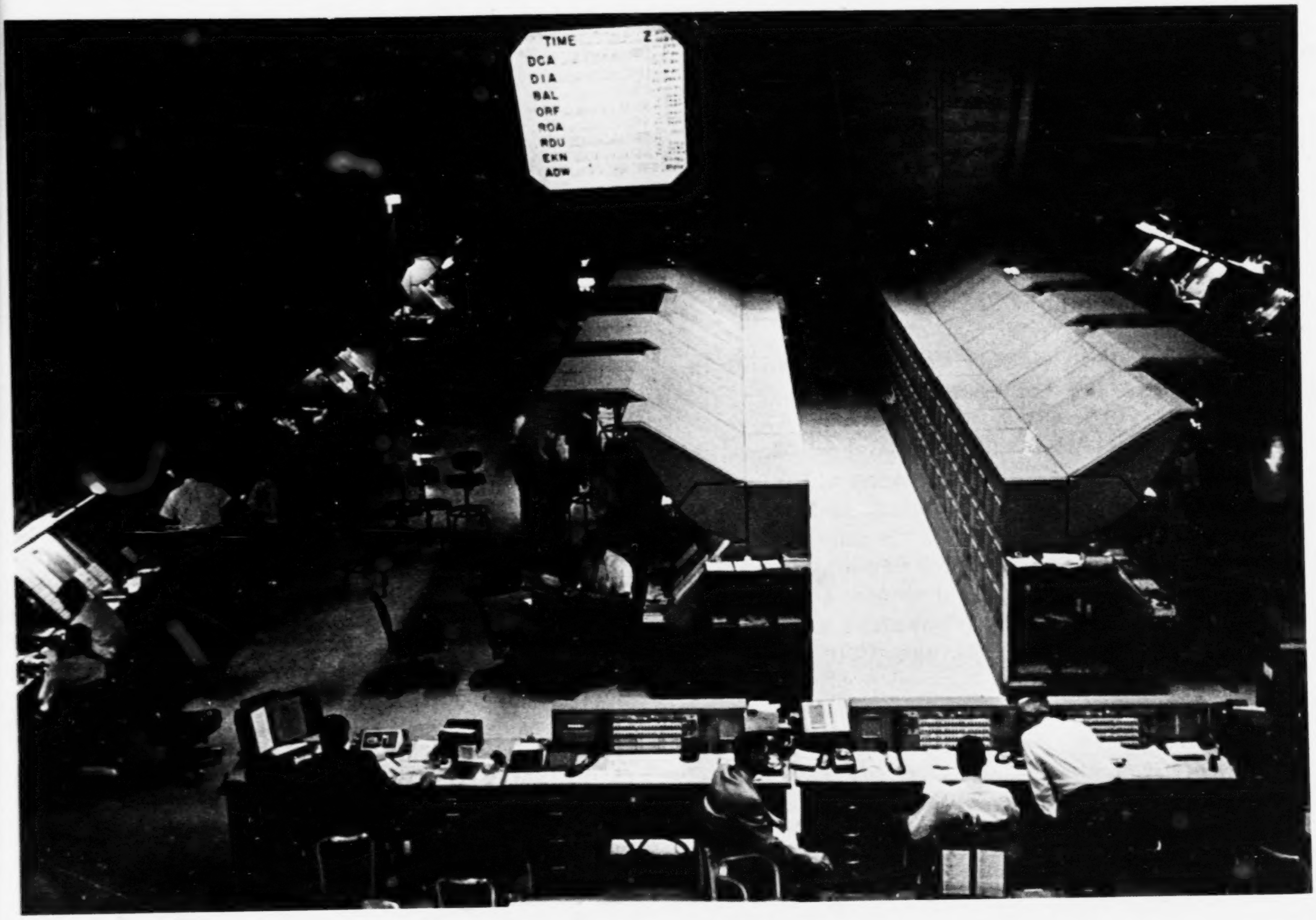
Opportunities for Training. Trainees receive six to eight weeks of instruction at a regional training location or at the FAA Academy in Oklahoma City, Oklahoma. After completion of the training period they are assigned to a tower for on-the-job training under close supervision for six months. Permanent assignment as an assistant controller follows successful completion of training. The FAA conducts upgrading training programs for controllers from time to time. It takes at least 3-1/2 years on the job to become a professional controller. Training in air traffic control may be obtained in the military service and many military air traffic controllers take jobs with the FAA after they leave the service.

Outlook for the Future. In line with predictions for continued rapid growth of all sectors of aviation, the need for air traffic controllers will continue to rise. More airports will have the required amount of air traffic to qualify for air traffic control towers and additional tower controllers will be needed to staff them. An increased emphasis on providing the maximum amount of safety devices will result in continued requirements for controllers.

AIR TRAFFIC CONTROL SPECIALIST (FAA)
at FAA Air Route Traffic Control Centers

Nature of the Work. The Air Traffic Control Specialist at FAA Air Route Traffic Control Centers gives pilots instructions, air traffic clearances, and advice regarding flight conditions along his flight path while flying the federal airways. He uses flight plans and keeps track of progress of all instrument flights from point to point within his Center's control area. He transfers control of aircraft on instrument flights to the controller in the adjacent Control Center when the aircraft leaves his Center's control area. He also receives control of flights entering his area of responsibility from adjacent Centers. He estimates the time of an aircraft's arrival over a navigation fix and maintains records of flights under his control.

Working Conditions. Air Route controllers work at FAA Air Route Traffic Control Centers forty hours a week, using electronic computers, radio, radar, teletype machines, telephones, and other electronic communications devices. Shift work is involved. They work in semi-darkness, and unlike the tower controller, never see the aircraft they control except as tiny "blips" of light on the radarscope. In areas of heavy traffic, work is demanding. Registration numbers of all aircraft under control must be recalled quickly, as well as types, speeds, and



Controllers at an Air Route Traffic Control Center keep track of planes flying along the Federal Airways.

distances between navigational aids and points for hundreds of miles along the federal airways in his control area.

Where the Jobs Are. FAA employs 7,617 controllers at 27 Air Route Traffic Control Centers located throughout the nation. Centers are usually found near a major city but outside the control area of the closest major airport.

Wages. The starting grade is GS-6, at $6,137 per year. Trainees are paid while learning their jobs. The highest grade for an operating professional (journeyman) air traffic control specialist at the Centers is GS-12 ($11,461 to $14,899 per year).

Opportunities for Advancement. Promotion to higher grades as assistant controllers and professional controllers depends upon the employee's performance and satisfactory achievement in his training program. Increases in grade (with accompanying increases in salary) are fairly rapid, but grades above GS-12 are for positions of watch supervisor, staff officer, and chief. During the first year, the trainee-controller is on probation and then he may advance from positions backing up professional controllers to primary positions of responsibility. It takes a trainee-controller from 3-1/2 years (minimum) to about six years of experience to reach the professional level. Promotion to a position as air traffic control programmer is possible. Professional controllers are selected for research activities with FAA's National Aviation Facilities Experimental Center at Atlantic City. Some are also selected to serve as instructors at the FAA Academy at Oklahoma City.

Requirements to Enter the Job. He must be able to pass a physical examination and he must be free from color blindess. One of the following is also required:

- Four years of college with a bachelor's degree.
- Three years of responsible work experience.
- Instrument flight rating.
- Air traffic control facility rating.
- Airline dispatcher certificate.
- FAA navigator certificate.
- Experience as an air traffic controller in the military services.

Applicants must also pass a two-hour written test and a personal interview during which alertness, decisiveness, diction, poise, and conciseness of speech are evaluated. A small number of women (21) are employed presently as air traffic controllers at Control Centers. Few occupations make more rigid physical and mental demands upon employees than that of an air traffic controller.

Opportunities for Training. Trainees receive 6 to 8 weeks of instruction at a regional training location or at the FAA Academy in Oklahoma City, Oklahoma. After completion of the training period they are assigned to trainee positions for on-the-job training under close supervision for six months. Permanent assignment as an assistant controller follows successful completion of training. The FAA conducts up-grading training programs for controllers from time to time. It takes at least 3-1/2 years on the job to become a professional controller.

Outlook for the Future. In line with predictions for continued rapid growth of all sectors of aviation, the need for air traffic controllers will continue to rise. As airports generate greater volumes of air traffic, and as emphasis on providing the maximum amount of safety grows, there will be a continuing requirement for additional controllers at Air Route Traffic Control Centers. However, automation of procedures will offset the increase in workload, and this will affect the number of controllers needed at the Centers.

FLIGHT SERVICE SPECIALIST (FAA)
at Flight Service Stations

Nature of the Work. The Flight Service Specialist at FAA Flight Service Stations renders pre-flight, in-flight, and emergency assistance to all non-airline civil and military pilots, on request. He gives information about and broadcasts weather conditions at airports and along flight paths; relays air traffic control instructions between controllers and pilots; assists pilots in emergency situations; and initiates searches for missing or overdue aircraft.

Working Conditions. Shift work is involved. He uses a telephone, radio and teletypewriter, and radio telephones. He works in office situations close to communications equipment for forty hours as a normal work-week.

Where the Jobs Are. FAA Flight Service Stations are found at 328 airport locations throughout the country, and at 12 points outside the country. About 4,459 Flight Service Specialists are employed.

Wages. The starting grade is GS-6, at $6,137 per year. Trainees are paid while learning their jobs. The highest grade for the Flight Service Specialist is GS-9 ($8,054 to $10,475 per year).

Opportunities for Advancement. Excellent opportunities exist for the employee to progress to higher grade levels as he gains experience and as his responsibilities and the complexity of his duties increase. Beginning as a trainee in the Flight Service Station, he may advance to a Communications (Journeyman) Specialist to a Watch Supervisor, and then to Chief of the Facility--the top administrator at the station. As a further upward step, a few positions, at higher grade levels, are available in FAA area offices with administrative responsibilities over all Flight Service Stations within the area's jurisdiction.

Requirements to Enter the Job. Candidates must be able to pass a physical examination. One of the following is also required:

- Three years of responsible work experience.
- Air traffic control facility rating.
- Airline dispatcher certificate.
- FAA navigator certificate.
- Experience in air traffic control with the military services.
- 2-1/2 years air/ground communications or flight operations experience.
- 350 hours flight time as co-pilot or higher.

Applicants must also pass a two-hour written test and a personal interview during which alertness, decisiveness, diction, poise, and conciseness of speech are evaluated. A small number of women (81) are employed presently at Flight Service Stations.

Outlook for the Future. The number of Flight Service Specialists is not expected to increase as are jobs in other areas of air traffic control employment. Flight Service Stations will serve larger areas with the greater use of long distance telephone and other communications devices. Even though the number of opportunities for jobs as Flight Service Specialists is not expected to increase greatly, those jobs that are available are stepping stones to air traffic control careers in FAA-operated airport control towers and at Air Route Traffic Control Centers.

ELECTRONIC TECHNICIAN (FAA)

Nature of the Work. The Electronic Technician (FAA) installs and maintains electronic equipment required for aerial navigation, communications between aircraft and ground services, and control of aircraft movements to assure safety in the air and smoothly flowing air traffic. This involves work with radar, radio, computers, wire communications systems, and other electronic devices at airports and along the network of federal airways. It includes preventive maintenance (inspection of equipment, meter reading, replacement of deteriorating parts, adjustments, etc.) and corrective maintenance (troubleshooting, repair and replacement of malfunctioning equipment). Electronic technicians may also specialize in design, development, and evaluation of new types of electronic equipment for the federal airways.

Working Conditions. They usually work out of an Airways Technical Field Office with other technicians whose work is directed by a supervisor. The office frequently is located at an airport and the equipment for which the office is responsible is within a 30 or 40-mile radius of the airport--in control towers, air route traffic control centers, flight service stations, or in open fields and even on remote mountain tops. Some of the work muut be performed outdoors in all kinds of weather. Forty hours comprise a regular work week, with shift work and weekend work rotated.

Where the Jobs Are. The Federal Aviation Administration employs about 7,500 electronic technicians. Most electronic technicians work in field offices or "sectors" scattered all over the country. Some work is located at the FAA's National Aviation Facilities Experiment Center, which is engaged in electronic research and development projects.

Wages. The entrance level starts at GS-5 ($5,565 per year). Additional cost-of-living allowances are given to employees working at "hardship" locations, such as in Arctic regions and at Pacific Ocean sites.

Opportunities for Advancement. The employee has opportunities to progress to higher grade levels depending upon the complexity of his duties, the degree of supervision received or exercised, and the growing knowledge and skills used in the performance of his work. Supervisory positions are available at sector, area, and regional offices. Promotion to managerial jobs at FAA headquarters offices is possible.

Requirements to Enter the Job. Age eighteen is the minimum age. Experience and education or training in electronics (a knowledge of basic electronic theory and related mathematics, transmitters and receivers, use of test equipment, techniques of troubleshooting and circuitry analysis, use of tools, and installation practices) are required. The greater the degree of education and/or experience, the higher the entrance level. Applicants must have had a minimum experience of the kinds and amounts indicated in the table below for each grade. Excess "Specialized" experience may be credited as "General" experience. Some types of civilian or military education, related to the option for which application is made, may be substituted for the specialized experience requirement. In addition, the applicant must show an ability

GRADE	GENERAL EXPERIENCE Years	SPECIALIZED EXPERIENCE Years	TOTAL Years
GS-5	3	0	3
GS-6	3	½	3½
GS-7	3	1	4
GS-8	3	1½	4½
GS-9	3	2	5
GS-11 & 12	3	3	6

to work without supervision and to write reports. He must be able to pass a physical examination and he must be free from color blindness. A technician may, in connection with the performance of his regular duties, be required to drive a Government-owned automobile or truck.

Opportunities for Training. Basic training is available at technical and vocational schools offering courses in electronics. Upon assignment to an FAA sector office, the new employee undergoes a short period of on-the-job training to familiarize him with FAA equipment and procedures. As developments in the field of electronics are rapid, the employee is expected to keep abreast of new devices, systems, and procedures. Technicians usually receive three to four months of instruction in any one year on new developments at the FAA Academy in Oklahoma City. The Academy offers correspondence courses to support their technical training efforts and many of these correspondence courses are prerequisites to assignment for advanced courses at the Academy. The technician receives his regular salary and a subsistence allowance while in training at the Academy. Basic training and experience for FAA employment may also be obtained during active duty in the military services.

AIRBORNE ELECTRONIC TECHNICIAN (FAA)

Technicians appointed for airborne instrumentation duty may be required to fly in government aircraft for data collection or engineering purposes. Applicants should indicate on their applications their willingness to fly. Basically, the requirements and salary scales are the same as for the Electronic Technician.

AVIATION SAFETY OFFICER– MANUFACTURING INSPECTOR (FAA)

Nature of the Work. The Aviation Safety Officer, Manufacturing Inspector (FAA) checks to see that the design, materials, and methods of producing civilian aircraft, aircraft engines, systems, and equipment are according to Federal Aviation Regulations safety standards and that the finished products are airworthy. He works with aircraft manufacturing engineers from the blueprint stage through the entire manufacturing process; supervises activities of FAA-designated inspection representatives; and participates in civil aircraft accident investigations.

Working Conditions. He generally works indoors in aircraft manufacturing plant offices on a forty-hour week basis. Considerable travel is required and the duty headquarters or station may be changed from time to time.

Where the Jobs Are. Manufacturing inspectors are employed wherever there are major aircraft, engine, propeller, or aircraft component manufacturing plants producing civil aircraft, or at FAA district, area, and regional office locations throughout the nation.

Wages. The entrance level is GS-9 and the starting salary ranges from $8,054 to $10,475 per year, depending upon the applicant's experience and education and upon an evaluation through personal interview of his fitness to assume varying degrees of responsibility.

Opportunities for Advancement. Manufacturing inspectors receive in-grade promotions at regular intervals upon continued acceptable work. If they demonstrate managerial skills, they may become Section or Branch Chiefs. Some inspectors are also assigned as instructors at the FAA Academy.

Requirements to Enter the Job. Three years of general experience working in any of the major phases of manufacturing aircraft, engines, or propellers, plus two to three years of specialized experience gained by technical supervision over production or quality control in the production of civil aircraft, engines, propellers or major aircraft assemblies are required. A varying number of years of study in aeronautical, production, or industrial engineering may be substituted for an equal number of years of general experience or for a lesser amount of specialized experience. Currency of technical skills and knowledge are essential to meet job entry requirements.

Opportunities for Training. A college degree in aeronautical, production, or industrial engineering is the best preparation for entry jobs at higher levels. Technical or vocational school training in various trades associated with aircraft manufacturing (drafting, sheet metal work, air conditioning, electrical system, etc.) leading to jobs in aircraft manufacturing can give minimum background and experience. An orientation period of training is given to all new employees. From time to time, retraining is required as new developments in aircraft, engines, and equipment appear.

AVIATION SAFETY OFFICER– AVIATION ELECTRONICS INSPECTOR (FAA)

Nature of the Work. The Aviation Safety Officer, Aviation Electronics Inspector (FAA) examines compliance with air safety rules relating to airworthiness, adequacy, and proper operation of communications and electronic navigation equipment aboard aircraft. He may be an air carrier electronics inspector, working only with airlines or suppliers of airline electronics equipment; or a general aviation electronics inspector working with general aviation repair stations and their suppliers. In each case, whether an air carrier or a general aviation electronics inspector, he also checks the competency of repairmen working on electronic equipment, oversees FAA examinations for certification of repairmen, and participates in accident and violation investigations.

Working Conditions. His job requires considerable travel, as inspections, consultations, and investigations must be made at airline overhaul and maintenance bases, at general aviation repair stations, equipment manufacturing plants, or at the scenes of accidents. He works a basic forty-hour week in airline and general aviation hangars, repair shops, and offices. Change of assignment from one duty station to another is required as staffing demands.

Where the Jobs Are. Inspectors operate out of 27 Air Carrier District Offices, 77 General Aviation District Offices, and 4 Flight Standards District Offices (FSDO) which are a combination of both of the previously mentioned District offices. These are located throughout the country. Six International Field Offices have the same functions as the FSDO's.

Wages. The entry level is GS-9 and the starting salary ranges from $8,054 to $10,475 per year. The entry level depends upon previous experience and educational background.

Opportunities for Advancement. He enters employment as an Aviation Electronics Inspector and is given either a five-week indoctrination course in general aviation or air carrier electronic maintenance, depending upon his specialty. He receives ingrade promotions at regular intervals upon continued acceptable work. Outstanding inspectors may be promoted to the next higher level with increased responsibilities and salary. If he demonstrates managerial ability he may become a section or branch chief. He may also become an instructor at the FAA Academy.

Requirements to Enter the Job. Three years of general experience resulting in comprehensive knowledge of repair, overhaul, and inspection of electronic equipment for airline, military, or general aviation aircraft; or experience in installing and maintaining aircraft communications equipment, are required. Also two to three years specialized experience as an administrator or supervisor having responsibility for the airworthiness of electrical and electronic equipment of either an FAA-certificated air carrier, and FAA-approved radio repair station, or at a military base. College level study in electrical, radio, or electronic engineering may be substituted for some of the general experience. The longer the years of experience, the higher is the entry grade and accompanying salary. During interviews, the applicant's personal characteristics are evaluted to determine his fitness to contribute to safe air travel and the safety goals of the FAA.

Opportunities for Training. Basic training in electronics and communications systems at a technical or vocational school is the minimum. College level work in electrical, radio, and electronic engineering is preferred. Orientation courses are given to all new inspectors. Further training at the FAA Academy or at a manufacturer's service school is required as new developments in electronic equipment and methods demand.

AVIATION SAFETY OFFICER– MAINTENANCE INSPECTOR (FAA)

Nature of the Work. The Maintenance Inspector (FAA) checks compliance with air safety rules relating to maintenance of aircraft, inspecting maintenance procedures, methods, spare parts stock, employee training programs, instructional materials, maintenance manuals, etc., relating to airframes, engines, propellers, instruments, and related equipment. He may be an air carrier maintenance inspector working only with airlines, making inspections of aircraft, engines, propellers, instruments, etc., analyzing mechanical reports and records, supervising FAA-designated airframe and power plant examiners, and checking the competency of airline mechanics. Or he may be a general aviation maintenance inspector overseeing maintenance procedures of general aviation aircraft and checking the training of aviation mechanics. He inspects airworthiness of airframes, engines, propellers and components of aircraft as well as repairs, alterations, and general maintenance. He also inspects aviation mechanics training schools and repair stations, and gives examinations to student mechanics applying for FAA certificates. Both air carrier and general aviation maintenance inspectors participate in accident and violation investigations in their respective fields.

Working Conditions. The job requires considerable travel, as inspections, consultations, and investigations must be made at airline overhaul and maintenance bases, at general aviation repair stations, equipment manufacturing plants, or at scenes of accidents. He works in airline and general aviation hangars, repair shops and offices, for a forty-hour week. Change of assignment from one duty station to another is required as staffing demands.

Where the Jobs Are. Inspectors operate out of 27 Air Carrier District Offices, 77 General Aviation District Offices, and 4 Flight Standards District Offices (FSDO), which are a combination of both of the previously mentioned District offices. These are located throughout the country. Six International Field Offices have the same functions as the FSDO's.

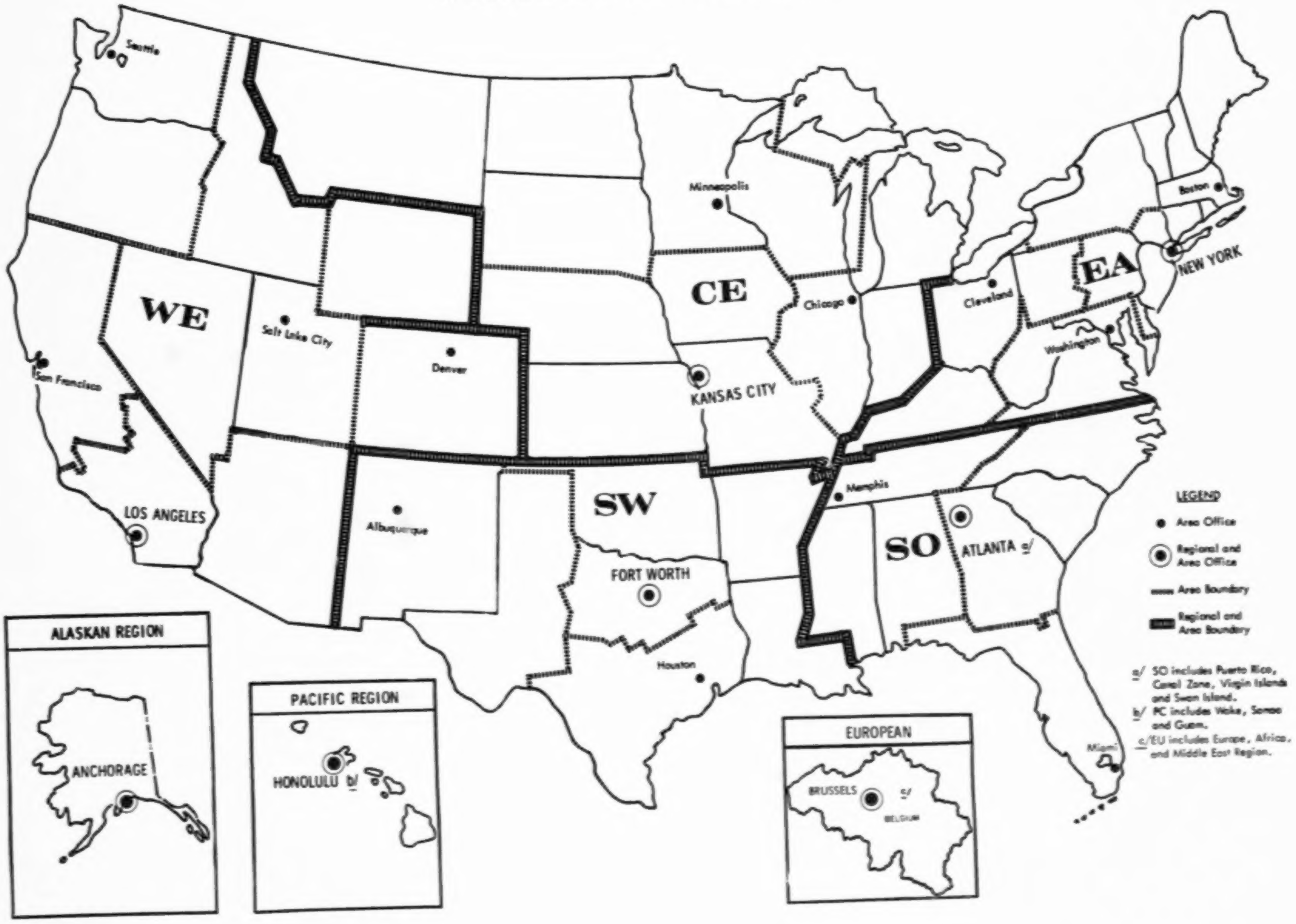
Wages. The entry level is GS-9 and the starting salary ranges from $8,054 to $10,475 per year.

Opportunities for Advancement. He enters employment as either an air carrier maintenance inspector or general aviation maintenance inspector and is given a five-week indoctrination course on his specialty. He receives in-grade promotions at regular intervals upon continued acceptable work. Outstanding inspectors may be promoted to the next higher level with increased responsibilities and salary. If he demonstrates managerial ability, he may become a section or branch chief. He may also become an instructor at the FAA Academy.

Requirements to Enter the Job. The entry level requires three years of general experience in the maintenance and repair of airframes, aircraft engines, aircraft components and related subassemblies, and two years special experience. For the air carrier maintenance inspector, this two-year special experience must be gained as a superintendent, assistant superintendent, general foreman, shop foreman, chief inspector, or maintenance supervisor in connection with the maintenance of large transport aircraft, including maintenance or final assembly inspection of airframes, engines, propellers, instruments, and related accessories. This experience must be with a scheduled or large nonscheduled certificated U.S. airline, with air transports operated by the military services, or with general aviation aircraft operated under the same standards and procedures used by certificated airlines. For the general aviation maintenance inspector, the two-year special experience must include experience gained as a supervisor of aircraft and engine repair and overhaul, foreman of an aircraft and engine repair shop, or mechanic responsible for final approval of aircraft or engine major overhaul and repair. For both air carrier and general aviation maintenance inspectors, additional years of special experience are required to enter at a higher GS-level. College level study in engineering, business administration, or law may be substituted for some of the required general experience.

Opportunities for Training. Basic training as an aviation mechanic in a technical or vocational school is a starting point. College level work in aeronautical engineering or aeronautical maintenance is preferred. Inservice training for air carrier inspectors is required at the FAA Academy on systems and equipment of various airline aircraft from time to time. For general aviation inspectors, training is necessary at

FAA
REGIONAL AND AREA BOUNDARIES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Houston
Miami
LEGEND
Area Office
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Area Boundary
Regional and Area Boundary
a/ SO includes Puerto Rico, Canal Zone, Virgin Islands and Swan Island.
b/ PC includes Wake, Samoa and Guam.
c/EU includes Europe, Africa, and Middle East Region.
ALASKAN REGION
ANCHORAGE
PACIFIC REGION
HONOLULU b/
EUROPEAN
BRUSSELS c/
BELGIUM

intervals in aircraft alteration, electrical systems, instruments, and auto pilots, engines, etc., and as new developments in aircraft, engines, and equipment appear. Additional training is also necessary as the employee progresses to higher levels of responsibility.

AVIATION SAFETY OFFICER–OPERATIONS INSPECTOR (FAA)

Nature of the Work. The Operations Inspector (FAA) administers compliance relating to pilot competency and training and investigates accidents and violation cases. An air carrier operations inspector deals with airline pilots and co-pilots, flight engineers, navigators, radio operators, and aircraft dispatchers. He checks their continuing ability to perform their jobs through inspection, examinations and tests, and supervises FAA designated air carrier airmen examiners. The general aviation operations inspector is guided by the Federal Aviation Regulations relating to general aviation pilots and pilot training--including testing of pilots (both written and flight tests), observance of flight and ground instructors and flight training schools, and supervises FAA-designated pilot examiners. Both types of inspectors participate in accident and violation investigations in their respective areas.

Working Conditions. The job requires considerable travel, as inspections, consultations, and investigations must be made at airline bases, at general aviation facilities, or at the scenes of accidents. He works in airline and general aviation hangars and offices. Forty hours constitutes a normal work week. Change of assignment from one duty station to another is required as staffing demands.

The general aviation operations inspector gives written examinations to general aviation student pilots.

Where the Jobs Are. Inspectors operate out of 27 Air Carrier District Offices, 77 General Aviation District Offices, and 4 Flight Standards District Offices (FSDO), which are a combination of both of the previously mentioned District offices. These are located throughout the country. Six International Field Offices have the same functions as the FSDO's.

Wages. The entry level is GS-9 and the starting salary ranges from $8,054 to $10,475 per year.

Opportunities for Advancement. He enters employment as either an air carrier operations inspector or general aviation operations inspector and is given an indoctrination course of four to six weeks. Air carrier operations inspectors' beginning responsibilities are limited to examinations and inspections of individuals. As he moves upward he assists a "principal inspector," then he may move up to a position of a principal inspector, who is responsible for the certification and surveillance of specific airlines. The work of the beginning general aviation operations inspector is limited to examinations and inspections of certificates of individuals. His next upward step is to assist a "principal inspector" who is responsible for the certification and surveillance of such operations as fixed base operators, air taxi operators, flying schools, etc. The highest jobs in the field are those of District Office Supervisors. Planning, developing, executing, and evaluating general aviation operations programs on a regional or nation-wide basis occurs at FAA headquarters.

Requirements to Enter the Job. Three years' general experience as a pilot or co-pilot in general aviation, airline, or military aviation is required. For the air carrier operations inspector, the requirements include one to three years special experience as a pilot or co-pilot in positions providing broad and intimate knowledge of operational requirements, facilities, practices, and procedures of flying large multi-engine air transports or helicopters (either airline or military) or a high performance jet. In addition, a valid commercial pilot's license, with multi-engine and instrument ratings, is necessary — plus he must possess or be eligible for an air transport rating. In place of some years of general experience, various kinds of experience may be substituted such as that of chief pilot of an airline, a designated pilot examiner, supervisor of flight operations for an airline, or a number of qualifying FAA jobs, such as Facilities Flight Check Pilot, FAA pilot, etc. For a general aviation operations inspector, the specialized experience (one to three years) must be as a flight instructor or flight test pilot, air carrier or business aircraft pilot, aerial applicator ("crop duster"), or aerial photography pilot, charter flying, or any other full-time professional piloting duties. Various substitutions for flying may be made if the applicant has been a chief flight instructor for a college or university-operated flight school, chief pilot for an airline or business fleet operation, or if he has been an FAA facilities flight check pilot, flight test pilot, or supervising instructor. He must also hold a valid commercial pilot certificate with single engine, multi-engine, and instrument ratings and a flight instructor certificate with an airplane rating. Some college study may be substituted for years of general experience for either the air carrier or general aviation operations inspector. He must also have a Second Class FAA medical certificate.

Opportunities for Training. Flight training may be obtained in the military service or at private or university-operated flight schools for private and commercial pilot licenses, multi-engine, and instrument ratings.

FACILITIES FLIGHT CHECK PILOT (FAA)

Nature of the Work. The Facilities Flight Check Pilot conducts in-flight inspections of ground-based air navigational facilities to determine if they are operating correctly. He pilots multi-engine aircraft specially equipped as a flying electronic laboratory on day and night flights both under visual and instrument flight rules, recording and analyzing facility performance, and reporting potential hazards to air navigation. He assists in accident investigations by making special flight tests of any FAA navigational aids involved. He maintains liaison with aviation interests regarding the installation, operation, and use of air navigation facilities.

Working Conditions. His job requires considerable travel, as flights cover not only the federal airways but also areas where navigational aids are located. The basic work week consists of forty hours.

Where the Jobs Are. He works out of Flight Inspection Field Offices and Flight Inspection District offices scattered over the nation.

Wages. The entry level is GS-9 and the starting salary ranges from $8,054 to $10,475 per year.

Opportunities for Advancement. An employee enters as a trainee, then advances to the job of second-pilot on an in-flight inspection of air navigation facilities. The next step is that of Supervisory Airplane Pilot who supervises the flight inspection crew and evaluates and reports findings on navigation systems. The top jobs, located in Field offices, are those of Supervisors, responsible for the overall program accomplishment of the Field offices. If assigned to a Flight Inspection District Office, the employee can advance through second-pilot to Airspace and Procedures Specialists responsible for developing instrument approach, terminal, and en route air traffic procedures or he may move up to become Senior Flight Inspector and Aircraft Commander, supervising flight crews and results of inspection missions. Supervisors of the District Offices are the top jobs.

Requirements to Enter the Job. Three years general experience as a pilot or co-pilot in general, air carrier, or military aviation is required. One to three years specialized experience as a professional pilot or co-pilot in flight instruction, flight testing of airmen, or other full-time professional pilot duties is also required. He must hold a valid commercial pilot license with multi-engine and instrument ratings, and have experience as a certificated air traffic controller, an FAA pilot, inspector or flight test specialist in airline or general aviation operations. College level study may be substituted for some time in general experience. He must have a valid Second Class FAA medical certificate and must requalify periodically in physical examinations to maintain employment in this job.

Opportunities for Training. Flight instruction may be obtained from private or university-operated flight schools or from the military service.

FLIGHT TEST PILOT (FAA)

Nature of the Work. The Flight Test Pilot (FAA) checks the airworthiness of aircraft through inspection, flight testing, and evaluations of flight performance, engine operation, and flight characteristics of either prototype aircraft or modifications of production aircraft and aircraft components that are presented for FAA-type certification. He supervises FAA-designated flight-test representatives and participates in investigations of accidents and violations of the Federal Air Regulations.

Working Conditions. He flies new types of aircraft under all kinds of conditions to test their performance. Considerable travel is required and duty station may be changed from time to time as circumstances require.

Where the Jobs Are. The jobs are located in areas where aircraft manufacturing plants are situated, chiefly, in California, Washington, Missouri, Maryland, Texas, Kansas, Florida, New York, etc. (See chapter on aircraft manufacturing.)

Wages. The entry level is GS-9 and the starting salary ranges from $8,054 to $10,475 per year. Entrance salary will vary with the degree of the applicant's experience and training.

Opportunities for Advancement. The Flight Test Pilot may progress to branch chief positions in the engineering or manufacturing areas. An administrative post with respect to all FAA flight test pilots at FAA headquarters or, perhaps, an assignment with the National Aviation Facilities Experimental Center — the research and development arm of FAA — may provide opportunities for an administrative flight test engineering job.

Requirements to Enter the Job. Three years of general experience as a pilot or co-pilot in any civilian or military major aircraft operation is required. Also required is one to three years of special experience in the aircraft manufacturing industry or in the military or civil service of the Federal Government as a flight test pilot, aeronautical engineer, or flight test engineer. The special experience must include engineering flight testing of experimental types of aircraft or the solution of technical engineering problems at a professional level. He must have experience in obtaining and evaluating flight data related to flight performance, flight characleristics, engine operation, and other performance details of the prototype or modifications of production aircraft. Experience as in instructor in engineering flight testing of aircraft is also required. The higher entry grades require completion of a flight test pilot course, such as a military flight test school or the FAA flight test pilot course. College study in aeronautical, electrical, electronic, or mechanical engineering, mathematics or physics may be substituted for some of the general experience requirements. He must have a First Class FAA medical certificate, plus 1,500 to 2,000 hours of flight time, a commercial pilot license and single engine, multi-engine, and instrument ratings. He must pass physical exams at regular intervals to retain his job.

Opportunities for Training. Flight training with advanced training at a military flight test school may be obtained in the military service. Flight training through commercial pilot's license with appropriate ratings may be obtained from private or school-connected flying schools and institutes. A college degree in aeronautical engineering with flight training is preferred.

GENERAL FACILITIES AND EQUIPMENT REPAIRER (FAA)

Nature of the Work. There are a number of employees classified under the "Trades and Labor" wage schedule. These employees perform jobs associated with the trades and crafts and are paid on an hourly basis. One example of a "Trades and Labor" employee is the General Facilities and Equipment Repairer (FAA). He maintains aids to air navigation such as the approach light systems serving airport runways. He also works on the structural, electrical, and mechanical devices that are major parts of other facilities. This includes maintenance and repair of heating, air conditioning, and ventilating systems; electrical generating and power distribution systems; and the buildings and antenna structures that house a wide variety of FAA facilities. The job involves carpentry, painting, plumbing, electrical, and masonry construction; installation, repair, and maintenance of air-conditioning, heating, or power generating equipment. He drives a work-truck.

Working Conditions. He works indoors or outdoors as the jobs require. He may work on outdoor structures to heights up to 300 feet. The basic work-week consists of forty hours. He must be able to drive a truck to jobs in outlying areas.

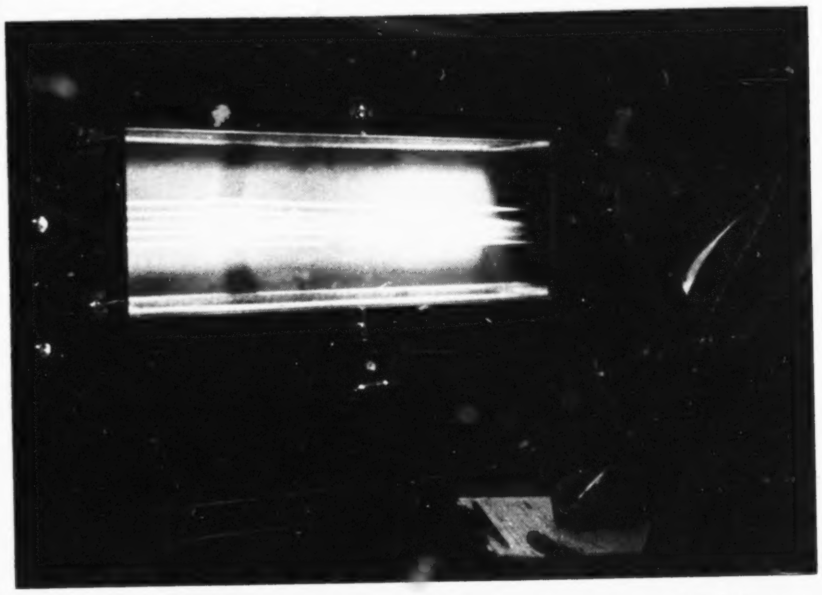
Where the Jobs Are. Such jobs are located in all areas of the U.S., Puerto Rico, the Virgin Islands, and anywhere that FAA air navigational aids and air traffic control towers and centers are situated.

Wages. Hourly wages vary according to experience and the prevailing rates paid where the jobs are located. For example, in one area they range from $2.33 to $3.45 per hour.

Opportunities for Advancement. Wages increase as an employee demonstrates his ability to work without constant supervision.

Requirements to Enter the Job. Four years of progressively responsible experience in two or more of the following occupational groups: machinist, machine repairman, automobile mechanic, carpenter, woodworker, electrician, electric motor repairman, painter, air-conditioning and refrigeration repairman, heating equipment and power generating repairman. Training in a trade school may be substituted for some of the required experience. He must have a driver's license.

Opportunities for Training. Training can be acquired in high school industrial arts classes and in vocational or technical schools.



An FAA engineer observes air flow patterns created by a model plane in a smoke tunnel.

ENGINEERS

General Information. The FAA, as well as the National Aeronautics and Space Administration and the Department of Defense, employs engineers of all specialties to work on research and development problems in aviation, such as V/STOL (very short takeoff and landing) aircraft, the supersonic transport, aircraft sound, the sonic boom, hypersonic aircraft, and new equipment and devices to increase aviation safety. Engineers also provide guidance in airport design, construction, operation, and maintenance.

Nature of the Work. The facilities, devices, and machines needed by the Federal Aviation Administration to carry on its work require the services of a number of engineering specialists:

1. The Aerospace (Aeronautical) Engineer develops, interprets, and administers safety regulations relating to airworthiness of aircraft and their accessories. He analyzes and evaluates manufacturers' designs, sets up test procedures, observes tests, and furnishes engineering advice to manufacturers. He deals with such problems as vibration, flutter, stability, control, weight and balance, aerodynamic characteristics, etc.

2. The Electrical Engineer deals with power supply, distribution, and standby power generation required for the operation of air navigational aids. He is also involved in the design and evaluation of airport and runway lighting and electrical equipment aboard aircraft.

3. The Electronic Engineer is concerned with designing improved electronic navigational aids and communications systems. He may design, develop, modify, or oversee installation, calibration, and maintenance of ground and airborne electronic equipment. He recommends locations of aids.

4. The Mechanical Engineer is concerned with the design of gasoline and diesel power plants for standby power generation in case of emergencies. He is also concerned with heating, ventilating, and air-conditioning equipment at FAA installations. Some mechanical engineers check out such things as the performance of new types of aircraft engines, fuel systems, and fire detection devices.

5. The Civil Engineer involved in the airports program deals with a broad range of airport design, construction, and maintenance matters. FAA involvement in these matters is in the area of providing advice and guidance to civil airport developers, with particular emphasis on airports developed with Federal grants-in-aid.

Working Conditions. He works at a desk in an engineering laboratory, or outdoors conducting or observing tests of equipment during a forty-hour week. Travel may be required as the engineer consults with aircraft and engine manufacturers and with suppliers of all kinds of equipment related to his engineering specialty. He may travel to consult with state and city officials who need federal funds for building or improving airports and to military bases where equipment is tested.

Where the Jobs Are. Engineering jobs are located at FAA headquarters, district, and regional offices, at NASA headquarters and centers, and at certain military bases scattered throughout the nation.

Wages. GS-5 ($5,565 to $7,239) to GS-11 ($9,657 to $12,555) are beginning salaries, depending upon previous experience and educational background.

Opportunities for Advancement. Promotion is normally from within, with periodic in-grade increases for acceptable work and grade level promotions for outstanding accomplishment and managerial responsibilities.

Requirements to Enter the Job. A B.S. degree in engineering is required, or four years of technical engineering experience and training that provides technical knowledge equal to that possessed by a graduate engineer. None to three additional years of experience is required depending upon entry grade level.

Opportunities for Training. Engineering training may be obtained from colleges offering courses in the specialized engineering field.

ENGINEERING AIDES OR TECHNICIANS

Nature of the Work. Depending upon his specialty, the Engineering Aide or Technician assists engineers by drafting engineering plans, conducting efficiency and performance tests, making calculations, setting up laboratory equipment and instruments, and preparing technical reports, specifications, and estimates. His work is like that of technicians described elsewhere in this GUIDE.

Working Conditions. He works at a desk in an engineering laboratory or outdoors conducting or observing tests of equipment. The basic work-week is forty hours. Travel may be required as the Technician consults with aircraft and engine manufacturers and with suppliers of all kinds of equipment related to his engineering specialty. He may travel to consult with state and city officials, who need federal funds for building or improving airports and to military bases, where equipment is tested.

Where the Jobs Are. The jobs are located at FAA's National Aviation Facilities Experimental Center at Atlantic City, at NASA headquarters and centers, and at certain military bases scattered throughout the nation.

Wages. GS-5 ($5,565 to $7,239) to GS-12 ($11,461 to $14,899) are beginning salaries, depending upon previous experience and educational background.

Opportunities for Advancement. Promotion is normally from within, with periodic in-grade increases for acceptable work and grade level promotions for outstanding accomplishment and managerial responsibilities. With additional training, Technicians may advance to Engineer positions.

Requirements to Enter the Job.

Grade	General Experience	Specialized Experience	Total
GS-4	1½ Years	½ Year	2 Years
GS-5	2 Years	1 Year	3 Years
GS-6	2 Years	2 Years	4 Years
GS-7	2 Years	3 Years	5 Years
GS-8/12	2 Years	4 Years	6 Years

Opportunities for Training. The Technician may study his specialty at a vocational or technical school, junior/community college, or a four-year college.

OTHER PROFESSIONAL EMPLOYEES (FAA)

The FAA also requires the services of professional people other than engineers. Aviation medicine is a most important function and physicians who have chosen aviation medicine as a specialty beyond their general medical education are employed by the FAA in limited numbers. These physicians study such things as the effects of flying on the human body, the need for oxygen above certain altitudes, the effects of fatigue on pilot performance, vision and hearing standards, the tension and stress factors associated with the air traffic controller's job, and the standards of the various classes of medical examinations required for pilots and other members of flight crews.

A wide scope of professions are represented in FAA. These include Airport Safety Specialists, Urban Planners, Economists, Mathematicians, Statisticians, Program Officers, Management Analysts, and Budget Analysts.

The FAA requires logistic support for all its programs, particularly in the area of establishment, operation, and maintenance of air navigation and traffic control facilities. Personnel plan and manage programs for the establishment and installation of facilities, acquire real and personal property needed to establish, operate, and maintain facilities, and provide all aspects of property and materiel management. To do so, FAA employs personnel such as Logistics Program Planners and Managers, Real Property Specialists, Inventory and Supply Managers, Procurement Analysts, Contracting Specialists, Transportation Officers, and Purchasing Clerks.

The FAA also employs lawyers to write federal aviation regulations, to interpret them, and to represent the FAA in legal controversies. It employs many other kinds of workers found in business and industry such as accountants, public information officers, librarians, photographers, and supporting personnel such as receptionists, secretaries, typists, office machine operators, mail room clerks, and data computer programmers and operators. In addition, the FAA operates two federal airports in the Washington, D.C. area and employs runway, building, and ground maintenance personnel as well as an airport administrative staff. (See "Careers at Airports" described elsewhere in this GUIDE).

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation

The National Transportation Safety Board accident investigators interview victims and witnesses, examine aircraft parts, instruments and engines, maintenance and flight records to determine the probable cause of airplane accidents.

CIVIL AERONAUTICS BOARD (CAB)

The Civil Aeronautics Board is another federal agency concerned with aviation, particularly commercial air transportation. It employs lawyers to develop regulations, to make decisions about airline routes and fares, and to represent the U.S. in some kinds of international airline legal discussions. The aviation lawyers receive a general law education, and after passing their bar examinations begin their special practice in aviation law. The CAB also employs economists and statisticians who gather and interpret statistics so decisions can be made about changes in airline fares, routes, and services.

U. S. MILITARY SERVICES

The U.S. military services are large employers of civilians for jobs in aviation, such as aviation mechanics, engineers, technicians, and general office workers such as secretaries and typists. These civilian jobs come under the Federal Civil Service and employees do many of the same kinds of work and receive the same wages and benefits as their counterparts in the FAA or other federal government departments and agencies.

U.S. Air Force photo

An air traffic controller in the military service can qualify for a similar job with the FAA when he leaves the service.

There are many aviation career opportunities in the military services for enlisted men and officers, both men and women. The Air Force, of course, offers the greatest number of training and employment opportunities to fly as a pilot or to work as an aviation mechanic, air traffic controller, electronic technician, flight nurse, or meteorological technician, to name a few. Navy and Marine aviation also have their counterpart jobs to those in the Air Force. Army aviation is mostly connected with operation and maintenance of helicopters and subsonic light planes and requires flight crews and ground service people and weathermen, to support its aerial operations. Many of these military aviation jobs fit the serviceman for similar jobs in civilian life, if he chooses to leave the service. For example, flying officers released by the mililary services, especially the Air Force, have constituted the major source of supply of airline pilots in recent years. An Air Transport Association survey revealed that about 65 per cent of all airline pilots employed as of June 30, 1966 had had their principal training in the military services.

OTHER FEDERAL GOVERNMENT DEPARTMENTS AND AGENCIES

Many other federal government departments bureaus, and agencies operate aircraft to carry on their work more effectively; for example: the Fish and Wildlife Service of the Department of the Interior uses airplanes to make wildlife census; the Department of Agriculture's Forest Service uses aircraft to check on aerial forest spraying contracted to commercial operators, or to oversee forest fire-fighting procedures; the Immigration and Naturalization Service of the Department of Justice uses aircraft to track down people entering the U.S. illegally; and the U.S. Coast Guard operates aircraft for search and rescue purposes. Although pilot and mechanic jobs within these agencies are comparatively few in number, they are mentioned to complete the full picture of aviation career opportunities within the Federal Civil Service.

Pilots for these federal government agencies fly aircraft to transport office staff members and supplies, perform aerial surveys, make wildlife census, etc., as required by their particular government office. They fly in single or multi-engine aircraft during day or night, as required, and over all kinds of terrain in all kinds of flyable weather.

The jobs are based throughout the country wherever the department operations require. Pilots must have from 1,200 to 2,500 flying hours experience, including extended cross country flights over land and/or water during which they perform their own navigating. They must be able to pass a First Class or a Second Class FAA physical examination every six or twelve months, respectively. The annual salary ranges from GS 9 ($8,054 to $10,475) to GS 12 ($11,461 to $14,899), depending upon experience and educational background.

U. S. WEATHER BUREAU METEOROLOGISTS AND METEOROLOGICAL TECHNICIANS

Aviation is one of the largest consumers of weather information. Flight and weather are so interrelated that many people in aviation look upon the weather man as a member of the aviation team. Thus the meteorologist deserves at least some mention in any discussion of vocations in aviation even though his functions are not, of course, entirely for the benefit of the aviation community.

Nature of the Work. In general, the meteorologist who works most closely with aviation is an operational, or synoptic, meteorologist (as contrasted to the meteorologist working in theoretical or applied meteorological research). He is the forecaster who provides the day-to-day, hour-to-hour observations, analyses, forecasts, warnings, and advice to pilots, airport operators, and airlines. He reports weather conditions expected at airports, current conditions, and enroute forecasts.

U.S. Weather Bureau Meteorologists provide a major service to aviation.

His main tasks involve the interpretation of meteorological data provided by weather observations and instruments. At a small weather station he may carry on numerous functions, such as: making outside weather observations, reading and recording data from weather instruments, checking weather data coming in via a teletype machine, drawing weather maps, plotting the weather, providing forecasts, and notifying and advising pilots and other interested parties. At larger stations he may specialize in one or more of these duties, relying to some extent upon computerized data in order to plot the weather and produce a forecast. He sends forecasts via teletype or telephone to Flight Service Stations, airline dispatch offices, airports, and to other consumers of weather information. Often he advises pilots personally when assisting the pilot in drawing up a flight plan.

Working Conditions. He works indoors, sitting or standing at map tables while he works on weather maps and charts. He reads data from weather instruments such as anemometers, thermometers, barometers, theodolites, ceilometers, radiosondes, weather balloons, etc. He is able to operate a teletype machine. At times, he may be required to work outdoors for short periods, checking weather instruments and making observations. He may work alone at a small station or with other meteorologists and meteorological technicians at a large station. At airport Weather Bureau stations he meets private, business, and airline pilots. He usually works a forty-hour week. Overtime is required when weather conditions deteriorate. Shift work is required when a station is open 24 hours a day. He may be required to relocate to fill staffing requirements at another station.

Where the Jobs Are. The largest employer of Federal Government meteorologists is the U. S. Weather Bureau. Some 1,900 Weather Bureau meteorologists work at approximately 300 stations scattered throughout the 50 states, in Puerto Rico, in Arctic regions, at Wake Island, and at other Pacific Ocean sites. Major Weather Bureau stations are located at airports near large cities. A smaller number of Federal Government meteorologists work for the Air Force, Navy, Army, the FAA, NASA, and the U. S. Forest Service. (Meteorologists employed by the airlines have been treated in another section of this GUIDE.)

The Weather Bureau also employs meteorological technicians to assist meteorologists. Most of the job vacancies for this position are filled by applicants who have received their technical training during active duty in the armed forces. The meteorological technician performs semi-professional and scientific work, calibrating and using instruments for taking various kinds of measurements, observing, recording, computing, processing, classifying, and disseminating weather data. Most technicians are employed in meteorological research rather than in synoptic meteorology.

Wages. The salary ranges from an annual starting grade of GS-5 ($5,565 to $7,239) to a GS-15 ($18,404 to $23,921). The starting salary and position is determined by the amount of education and experience.

Opportunities for Advancement. Promotion to higher grades depends upon ability, work performance, and upon openings in jobs at the higher grades. In-grade promotions are made on the basis of experience and satisfactory performance of the job. With an increase in grade comes increased responsibilities as assistant chief or chief of a weather station or region. A few high level administrative jobs are available as vacancies occur.

Requirements to Enter the Job. One of the following two is required:

1. A full course of study, leading to a bachelor's degree in an accredited college or university, which has included or been supplemented by 20 semester hours in meteorology (including 6 semester hours in weather analysis and forecasting, and 6 semester hours in dynamic meteorology); and in addition, differential and integral calculus and 6 semester hours in college physics; or

2. At least 20 semester hours in meterology at an accredited college or university which has included 6 semester hours in weather analysis and forecasting, and 6 semester hours in dynamic meteorology; and in addition, differential and integral calculus and 6 semester hours in college physics; plus additional appropriate education or technical experience which when combined with the education prescribed above will total 4 years of education or education and experience. This preprofessional background must be of such quality that it provides a body of knowledge and abilities comparable to that normally acquired through the successful completion of a full course of study described in paragraph 1 above.

Opportunities for Training. More than twenty universities offer bachelor degrees in meteorology or equivalent, with others offering a major in meteorology. Training as a meteorological technician is obtainable while on active duty with the armed services or at some junior colleges or technical institutions.

Outlook for the Future. The science of meteorology is expanding and with it increased occupational opportunities. The Weather Bureau expects to hire at least 100 meteorologists with a BA degree each year to fill new positions and vacancies. Opportunities for military careers in meteorology are excellent and competent military meteorologist officers are given opportunities to receive advance degrees at government expense. At present the number of qualified students obtaining degrees in meteorology are fewer than can supply future expected demands. Although the demand is small, so few are entering the occupation that job opportunities are always available for the qualified applicant.

STATE AVIATION JOBS

Almost every state has an Aeronautics Department or Commission that consists of a small number of aviation-minded men and women usually appointed by the Governor to make policies about aviation activities within the state. They are not considered employees, as they are paid only expenses connected with their attendance at meetings.

The Department of Aeronautics, however, employs some or all of the employees listed on page 103

Frequently employees have dual responsibilities, especially when the staff is small. Qualifications and requirements for these various jobs are determined by state law; however, the top level employees (safety officers, field service representatives, and engineers) must have experience and training in their specialty. Most all employees working under state civil service enjoy retirement plans, social security, low cost group insurance, and medical service. In most cases, Department employees work out of the office in the state capital.

OUTLOOK FOR AVIATION CAREER OPPORTUNITIES IN GOVERNMENT

The projected growth of air travel increases the need for improved and accelerated aviation safety devices and practices. For example, with the growth of air travel, additional cities will qualify for FAA-operated control towers and increased airport landing systems. This will require larger numbers of air traffic controllers and technicians to service and maintain additional equipment. The expected growth in the production of aircraft will call for increases in the number of safety inspectors, both at the production level and at airline overhaul bases and general aviation repair stations. The increasing number of general aviation and airline pilots implies a larger number of safety officers dealing with flight instruction, flight schools, certification of airmen, and pilot proficiency. The expected increase in electronic devices aboard aircraft also will demand more safety inspectors. It is reasonable to conclude that the outlook for all job categories in the Federal Aviation Administration (with its primary mission that of aviation safety) will be favorable over the next decade, and the requirements for pilots for other federal government agencies is expected to increase 19 per cent, and for aviation mechanics, 30 per cent.

The future of civilian aviation careers with the military services is somewhat uncertain as demand is responsive to world conditions. The best predictions indicate an increase of at least 5 per cent per year over the next ten years.

Employment in aviation at the state government level is almost certain to show an upward trend as aviation activities within the states grow—more airports, enlargement of existing airports, more air traffic, greater numbers of pilots, etc.

Va. Dept. of Aeronautics photo

Virginia students make orientation flights in state-owned aircraft—a popular aviation education program of the State's Department of Aeronautics.

STATE AVIATION JOBS

Name of Job	Nature of Work	Annual Salary Range
Director	Promotes aviation in his state, administers state aviation regulations, represents his state at regional or national meetings, and directs the staff of the Department of Aeronautics.	$10,000-$18,000
Assistant Director	Assists the Director in his duties.	$ 8,500-$14,000
Administrative Ass't.	Handles the detailed routine operation of the Director's office.	$ 6,000-$ 9,500
Pilots	Fly state-owned aircraft as required, for example to take the State Governor to meetings. (Note: some Departments who do not employ pilots require the Director, his assistant, or some other staff member to assume pilot duties, when necessary.)	$10,000
Field service representative	Is in direct contact with aviation interests within the state. May be called upon to explain proposed or new flying rules, help with aircraft sound problems, or assist with an aviation education project.	$7,000-$13,000
Accountants and statisticians	Maintain financial records of the department and gather flight statistics about aircraft movements, registered pilots, accidents, hours flown, etc.	$5,000-$12,000
Stenos, clerks and typists	Carry on routine office jobs.	$3,500-$7,600
Engineers	Civil, electronics, radio and other engineering specialities involved in planning airports and improvements to airports, installing and supervising air navigational aids operated by the state.	$6,600-$16,000
Engineering Technicians (aides)	Assist engineers in their work (draftsmen, etc.).	$5,000-$10,000
Aeronautical Inspectors	Check compliance with state aviation regulations.	$6,000-$15,000
Aviation education officers	Carry out aviation education policies of the Department. Cooperate with schools in aerospace education programs.	$5,400-$12,000
Publications editors	Are responsible for publication of newsletters, releases, and other information of interest to pilots, airport operators, and fixed base operators in the state.	
Safety officers	Promote aviation safety, such as conducting weather seminars and other safety-type meetings for pilots.	
Aviation mechanics	Service and maintain state-owned aircraft.	
Surplus property officers	Search out surplus federal government property that might be useful to state aviation.	

WHERE TO OBTAIN FURTHER INFORMATION—about aviation careers in government. (Be sure to be as specific as possible when making each request.)

Air Traffic Control Association 525 School St., S.W. Washington, D.C. 20024	General information. Free.
Airways Engineering Society 1346 Connecticut Ave., N.W. Washington, D.C. 20036	General information. Free.
American Meteorological Society 45 Beacon St. Boston, Mass. 02108	The Challenge of Meteorology. Career Opportunities. Free booklet.
Careers Box 135 Largo, Florida 33540	Meteorologist No. S-84 Career Summary. 15 cents. Air Traffic Controller. No. 117B. Career Brief. 25 cents.
Chronicle Guidance Publications, Inc. Moravia, New York 13118	Occupational Briefs: Meteorologist No. 143. 35 cents. Meteorological Technician. No. 422. 35 cents.
Federal Aviation Administration Office of Personnel and Training Dept. of Transportation Washington, D. C. 20590	General information on FAA job opportunities. Specify particular career interest (air traffic control, electronic technician, etc.)
Interagency Board of U.S. Civil Service Examiners for Washington, D. C. 1900 E St., N.W. Washington, D. C. 20415	Air Traffic Control Specialist Announcement No. WA-7-39 Sept. 19, 1967. Free. Meteorologist. Announcement No. 346B Oct. 27, 1964. Free.
Recruiting services of the Air Force, Navy, Army	Literature on aviation careers. Free.
Science Research Associates 259 E. Erie St. Chicago, Ill. 60611	Air Traffic Controllers. No. 345. Occupational Brief. 40 cents.

CHAPTER EIGHT

Airport Careers

GENERAL INFORMATION

An airport can be a cleared grassy strip of level land, or an elaborate complex of thousands of acres of ground, runways, roadways, buildings, parking lots, equipment, and services with the number of employees equal to that of a small city. About 3,800 of the nation's approximately 10,000 airports are attended (that is, they offer at least a minimum of daylight service) and they range in service from one providing just aviation gasoline and a coke vending machine to one offering thousands of items and services required by the air traveler and by the airlines and operators of general aviation aircraft.

Airports may be privately owned by a lone operator who carries on all the functions of his airport with or without assistants, or by a group of private investors. Or an airport may be owned and operated by a city, county, regional, or inter-state governmental authority.

AIRPORT DIRECTOR

Nature of the Work. Airports are usually operated by a director or manager responsible either to the owners of the airport or to the local government authorities. He has been described as a "mixture of aviation expert, real estate operator, construction engineer, electronics wizard, management genius, and politician". He is involved in such activities as the following:

1. Making and enforcing airport rules and regulations.
2. Planning and supervising maintenance programs.
3. Negotiating leases with airport tenants, such as aircraft repair stations, terminal concessionaires, and airlines.
4. Surveying future needs of the airport and making recommendations.
5. Keeping records and making required reports.
6. Setting up the airport budget.
7. Promoting the use of the airport.
8. Training and supervising employees responsible to him.

Depending upon the size of the airport, he may or may not have one or more assistants such as an assistant director, engineer, controller, personnel officer, maintenance superintendent, and supporting office workers, such as secretaries, typists, and clerks.

If he is self-employed as a small airport operator, he probably also operates an aircraft repair station, sells aviation fuel, gives flight lessons, and offers air taxi or charter flights in addition to operating the airport.

Working Conditions. He works in an office usually in the terminal building at the airport. Has regular office hours except in times of emergencies. May be required to travel to settle agreements with airline tenants or to confer with state and federal airport officials. If he operates a very small airport, he may work long hours in his aircraft repair station, giving flying lessons, and making charter flights. In such cases, much of his time is spent outdoors. In many cases, the airport director is a part of the local government and would be involved in official meetings and community projects, especially those concerned with aviation.

Where the Jobs Are. Attended airports exist in every state of the union, ranging from one in the District of Columbia to 327 in Texas. Most of the attended airports are in California, Florida, Illinois, Indiana, Michigan, Missouri New York, Ohio, Pennsylvania, and Texas. Airlines serve approximately 540 airports, while the remaining 3,200 attended airports are used solely by general aviation aircraft. Scheduled jet service is provided 143 American cities, with 200 more expected to receive similar service by 1970. About 300 of the airports having airline service have air traffic control towers.

Wages and Benefits. Annual wages range from about $8,500 for the airport manager at a general aviation airport to $40,000 for the director of a major international airport. In general, the benefits of the airport director regarding such items as vacation and sick leave, social security, and retirement plans are comparable to those in business and industry.

Opportunities for Advancement. Unless the operator is a private owner and is self-employed, the job of an airport director is not an entry level job, but is open to those with experience and training. An airport director may better himself by moving to an assistant director's job or director's job at a larger airport. Also he may move upward to a commissioner of airports, if the city or county has more than one airport, or to a state-level job concerned with state regulation of airports. Job opportunities are often involved in political activities and appointments frequently are made on that basis, especially if the job does not come under civil service regulations.

Requirements to Enter the Job. Directors of airports with airline service usually are required to have a college degree in one of the following areas: airport management, business administration, public administration, or aeronautical or civil engineering. He also is required to have had experience as a director or assistant at an airport. Directors of small airports may qualify in some cases if they have only a high school diploma, but usually must have a pilot's license and three to five years' experience in several kinds of jobs associated with airport services--such as a fixed base operator, superintendent of maintenance, or assistant to the airport director.

The airport director must be familiar with state and federal air regulations (especially those pertaining to airports), zoning laws, legal contracts, public relations procedures, use of airport equipment, the proper handling of aircraft, and airline operations, if the airport is served by airlines. He must show leadership qualities, tact, initiative, ability to get along with others, and good judgment.

Opportunities for Training. Numerous universities offer courses and degrees in airport administration, public administration, business administration, and aeronautical or civil engineering. Some of these universities also offer flight training which, in conjunction with airport administration courses, would give the applicant a general knowledge of aviation and the airport's role in the community.

Outlook for the Future. The predictions for large increases in the number of airline passengers, air cargo tonnage, and the production and use of general aviation aircraft over the next decade will have their effects on airports. Existing airports will be enlarged. (In 1967 alone, bond issues for the improvement and construction of airport facilities totaled more than $515,000,000.) More airports will receive airline service. As the general aviation fleet grows, more airports will blossom with fixed base operators to service these additions to the total number of aircraft in use. More airports will come into existence as towns without airports, trying to attract new industry, will become aware of industry's increasing insistance on airport facilities near plant sites.

The present heavy air traffic at many large airports, creating landing and take-off delays, may bring about the construction of a network of smaller "satellite" airports to service general aviation aircraft and helicopters that will take the air travelers to and from the major airport for their long-haul trips.

All this growth will provide many additional opportunities for the airport director and members of his supporting staffs.

OTHER CAREERS AT THE AIRPORT

Assistant Airport Director. Helps the director carry out his responsibilities and may be in charge of maintenance employees, airport equipment, airport tenant relations, or any of the other kinds of work associated with an airport. His salary will vary according to the size of the airport -- from $6,600 to $13,600. Again, depending upon the size of the airport, requirements for the job of assistant director range from a high school diploma to an engineering degree. The larger metropolitan airports re-

U.S. CIVIL AND JOINT-USE AIRPORTS, HELIPORTS, AND SEAPLANE BASES ON RECORD WITH FAA

Location	Total facilities	Type of facilities			** Attended Airports	Airports served by Certificated Airlines
		Airports	Heliports	Seaplane Bases		
Total	10,015	9,209	419	387		
Total United States	9,990	9,186	418	386	3,822	542
Alabama	120	120	0	0	61	10
Alaska	607	441	6	160	77	15
Arizona	189	185	4	0	78	9
Arkansas	125	124	0	1	71	9
California	669	516	143	10	245	35
Colorado	175	163	12	0	55	12
Connecticut	75	49	17	9	26	4
Delaware	19	19	0	0	14	1
District of Columbia	3	2	1	0	1	2*
Florida	279	254	19	6	121	18
Georgia	171	169	2	0	75	12
Hawaii	46	46	0	0	14	1
Idaho	163	161	1	1	50	7
Illinois	446	424	17	5	130	16
Indiana	156	155	0	1	108	10
Iowa	228	226	1	1	89	11
Kansas	266	265	1	0	98	12
Kentucky	62	60	2	0	37	7
Louisiana	219	176	17	26	72	8
Maine	138	89	6	43	36	7
Maryland	81	70	10	1	42	3
Massachusetts	116	85	22	9	48	6
Michigan	250	242	1	7	142	21
Minnesota	256	228	1	27	73	12
Mississippi	157	157	0	0	79	13
Missouri	264	259	1	4	107	11
Montana	188	187	1	0	62	15
Nebraska	264	263	1	0	78	13
Nevada	76	76	0	0	27	4
New Hampshire	44	37	5	2	22	5
New Jersey	132	100	26	6	60	4
New Mexico	124	122	2	0	39	10
New York	332	281	23	28	159	21
North Carolina	181	180	1	0	72	14
North Dakota	178	178	0	0	47	7
Ohio	384	381	2	1	174	10
Oklahoma	201	200	1	0	88	11
Oregon	173	169	4	0	69	13
Pennsylvania	443	410	27	6	167	16
Rhode Island	11	11	0	0	7	1
South Carolina	100	98	0	2	44	7
South Dakota	104	103	1	0	39	9
Tennessee	100	100	0	0	55	9
Texas	881	856	22	3	327	30
Utah	68	67	1	0	29	4
Vermont	38	36	1	1	13	4
Virginia	136	128	7	1	63	10
Washington	198	182	5	11	90	13
West Virginia	47	46	1	0	21	10
Wisconsin	223	208	1	14	90	12
Wyoming	84	82	2	0	31	10
Outside U.S.	25	23	1	1	N.A.	8
Puerto Rico	17	16	1	0	N.A.	3
Virgin Islands	3	2	0	1	N.A.	2
South Pacific Islands	5	5	0	0	N.A.	3

* FAA identifies Dulles International Airport as being "located in D.C."

** Figures from AIRPORT SERVICES MANAGEMENT MAGAZINE, Sept. 1967. N.A.–Not Available.

Note: In Alaska, 281 airports and in Hawaii, 8 airports, are served by intra-state carriers.

quire three to seven years of experience at airports served by a number of airlines.

Engineer. Plans improvements and expansion of the airport. Checks on plans submitted by architects and contractors, oversees construction, handles real estate and zoning problems, administers Federal Aid to Airports programs, and directs maintenance of runways, taxiways, hangars, terminal buildings, and grounds. Engineers are employed mostly by larger airports and a degree in engineering, plus three to seven years of experience in his engineering specialty are required.

Other Employees on the Airport Director's Staff perform the usual duties of their chosen careers: controller, secretary, typist, etc., and salaries, qualifications, and training opportunities are the same as for other workers in these areas of employment.

Airport Serviceman. Works under the direction of the airport manager or engineer. May do one or more of the following jobs:

- Fills holes, levels low places and bumps on runways and taxiways.
- Cuts grass on airport grounds and maintains shrubbery.
- Operates snow removal equipment.
- Services runway lights, replacing defective lamps and fuses.
- Maintains electrical service on airport, paints buildings, and does general carpentry work on small repair jobs.

Large airports employ workers who specialize in one of the foregoing jobs, for example: airport electrician. Many trades and crafts are needed at the airport, although small airports usually contract for required maintenance. Training for such jobs, qualifications, wages, opportunity for advancement, and union agreements are the same as for other workers in the trades and crafts.

Safety Employees. Many airports with airline service maintain fire-fighting and crash rescue equipment. This provides employment for small numbers of trained firefighters and rescue workers, some of whom may be responsible for the inspection of fire hazards on the airport premises and for reporting violations of airport fire regulations.

Terminal Concessionaires. Airport terminals provide services for air passengers such as restaurants, newsstands, gift and book shops, car rental agencies, and Skycap baggage service. (Only a few airlines employ Skycaps; most leave this service to terminal concessions.) Workers in the airport flight kitchens cater to airlines that do not have their own flight kitchens. Workers in the foregoing concessions are mentioned only because they do have a place in the total employment picture of the airport.

Airport beacons are kept bright by the airport serviceman.

Fixed Base Operator (FBO). A fixed base operator is a retail firm that sells general aviation products or services at an airport. He may employ one or two people, or he may have a hundred workers. He may offer one or more of the following services: aircraft airframe, engine and/or instrument repairs; flight training; air taxi service and charter flights; aircraft sales; aircraft fuel and parts; and aircraft exterior and/or interior modification.

He employs aviation mechanics, flight instructors, and aircraft salesmen, depending upon the size and scope of his operations. These occupations have been discussed elsewhere in this GUIDE. He may also carry on a small aviation mechanics training operation, supervise the work of his mechanics, if he is a licensed aviation mechanic, and may even arrange for ground transportation and overnight accommodations for general aviation pilots and their passengers.

His place of business may be a small hangar or shop with an adjoining office and perhaps a pilot's lounge, or an elaborate series of hangars, shops, offices, classrooms and showrooms. His hours are determined by the amount of time he wants to devote to his business. Without assistants, he probably spends long hours every day at the airport.

As the FBO is essentially an entrepreneur, his opportunities for increased business and income depend upon his own initiative and ability to keep up with changes in aircraft, aircraft equipment, and services. The variety of activities in which he can engage as an FBO offer some assurance of stability in income.

It is difficult to determine just what are the requirements to become a fixed base operator. Certainly an interest in aviation and training as an aviation mechanic are basic. A pilot's license is not essential, but would give him a greater understanding of the many functions of an FBO, as well as contacts with pilots who may help his business. With a commercial pilot's license he could supplement his FBO income with air taxi and charter flights, and with a flight instructor's rating he could give flight lessons. Some training in business administration would also be helpful in setting up an efficient business operation.

The fixed base operator has a bright future. Today's general aviation fleet numbers about 112,000 aircraft. By 1980 this figure is expected to increase to about 315,000. All these aircraft will need fuel, parts, accessories, and regular maintenance and overhauls. They will need pilots to fly them. Aircraft servicing and maintenance, flight instruction, and fuel are three services offered by most FBO's. They will continue to be offered in increasing volume as the general aviation fleet increases in numbers. Airports presently unattended will gradually offer various services to the general aviation pilot. Airports now having FBO's as tenants will be adding FBO facilities. Predictions for opportunities as a fixed base operator are very optimistic over the next 15 years, especially if the FBO can attract customers with an efficient, orderly, and accommodating service.

Lineman. The fixed base operator employs linemen or ramp servicemen who greet arriving aircraft, guide them to parking spots, assist pilots to tie down their aircraft, and perform the familiar duties of a "gas station attendant"—filling the tanks with gas, checking the oil, emptying ash trays, vacuuming the interiors, washing the windshield, and reporting to the owner signs of incipient trouble, such as oil leaks.

Linemen are usually young men in their teens who are interested in aviation and begin their aviation careers building up experience with aircraft under the guidance of a fixed base operator. They are usually paid an hourly rate and often work part time after school hours, on weekends, and summers. With their earnings they learn to fly or to take up an aviation mechanic's trade. The lineman's job is basic and leads to many aviation careers, especially those associated with airport administration, a fixed base operation, *aviation mechanic, professional* pilot, or air traffic controller.

WHERE TO OBTAIN FURTHER INFORMATION—about airport careers. (Be sure to be as specific as possible when making each request.)

American Association of Airport Executives 2029 K St., N.W. Washington, D. C. 20036	Airport executive information.
Careers Box 135 Largo, Florida 33540	Career summary. Airport Superintendent Manager. 15 cents.
National Aviation Trades Association 1346 Connecticut Ave., N.W. Washington, D. C. 20036	Information about Fixed Base Operators.
Science Research Associates 259 E. Erie St. Chicago, Ill. 60611	Occupational brief. Airport Managers. No. 271. 40 cents.

CHAPTER NINE

Aviation Education and Other Aviation-Related Careers

AVIATION EDUCATION

Aviation education is a relatively new development within the field of education. Aviation has had so many social, political, economic, and technological impacts on society that many educators realize the study of aviation merits a place in the curriculum. Whether as enrichment material in reading or in an elementary school geography class, whether as a high school elective course in aviation science or as a vocational education offering such as aviation mechanic, aviation education has been included in an increasing number of school curricula. High schools are offering for science credits aviation ground school courses which qualify students to take the Federal Aviation Administration written examination for the private pilot's license. Some high school courses include flight training leading to a private pilot's license.

For many years aviation education workshops have been held on college and university campuses to introduce elementary and secondary school teachers to the world of flight and its applications in the classroom. Some colleges and universities include a special division within the university to teach airport management, air transportation management, airport services, and courses to prepare students as professional pilots. Private schools also employ teachers who instruct in numerous aviation career subjects such as stewardess training, airline ticketing and reservations, aviation mechanics, and avionics technicians.

A number of agencies outside the public and private schools are involved in aviation education to varying degrees and with varying emphases:

1. Several major domestic and international airlines employ people with a professional education background to produce and distribute to teachers and students educational materials about commercial air transportation; to speak to teachers' groups and workshops; and to exhibit their educational materials at teachers' conventions.
2. Several general aviation aircraft manufacturers have an aviation education staff who produce classroom materials to assist teachers and general aviation education materials to interest prospective pilots, as well as to help pilots improve flying knowledge and skills.
3. Civil Air Patrol—USAF headquarters employs a staff of professional educators, who direct the work of aviation educationists at regional locations, and who publish aviation booklets, texts, and instructional materials for use in schools and for the use of CAP cadets, who, under the direction of local CAP leaders, learn about aviation.
4. Some state aeronautics commissions employ aviation education specialists who work with the schools in the state, advising curriculum directors, participating in state teachers' meetings and aviation education workshops, and/or distributing aviation education materials to teachers. Some state aeronautics commissions provide orientation flights for students in state-owned aircraft.
5. At the federal government level, the Federal Aviation Administration has a small staff of educators who are not only working with teachers and school administrators on elementary, secondary, and college levels, but also with the education of general aviation pilots, keeping them abreast of new developments in aviation and encouraging them to maintain their proficiency in flight. They hold flight clinics for both pilots and flight instructors and prepare and distribute educational materials. They assist in aviation education workshops and are consulted by curriculum directors who wish to incorporate some degree of aviation education in the curriculum.

It is not possible to supply information about salaries and benefits for people in aviation education, but generally they are commensurate with those of educators in other instructional areas. An A.B. degree and even a master's degree in education is a prerequisite to many of these positions. Often a private or commercial pilot's license and flight instructor's rating is required, especially when teaching ground school courses and flight training.

Aviation education has a future especially at the secondary level and at the college level in teacher training institutions where student teachers and workshop participants learn about the world of flight and its applications to many school subjects.

OTHER AVIATION-RELATED CAREERS

This GUIDE has treated in varying degrees of detail the major aviation career fields. It is impossible within the scope of this GUIDE to discuss an exhaustive list of aviation-related job opportunities such as:

- Aviation medicine
- Aviation law
- Aviation insurance
- Aviation publishing (trade journals, newspapers, periodicals, manuals, charts, books, etc.)
- Aviation writing (aviation editors for newspapers, feature writers for aviation periodicals, reporters, authors of aviation books)
- Flight safety research (through such organizations as the Flight Safety Foundation, Inc., and The Daniel and Florence Guggenheim Aviation Safety Center at Cornell University)
- Aviation museums
- Trade, professional and industrial aviation organizations such as the Air Transport Association, American Institute of Aeronautics and Astronautics, the Aerospace Industries Association, National Business Aircraft Association, Air Line Pilot's Association, National Aeronautic Association, and many others)

Many of the people employed in these areas are basically physicians, lawyers, insurance salesmen, writers and publishers, and administrators who have specialized knowledge and experience in aviation.

WHERE TO OBTAIN FURTHER INFORMATION—about aviation education and other aviation-related careers. (Be sure to be as specific as possible when making each request.)

Aerospace Medical Association
Washington National Airport
Washington, D. C. 20001

Airlines Medical Directors Association
c/o United Air Lines, Inc.
John F. Kennedy International Airport
Jamaica, New York 11430

Association of Aviation Psychologists
5108 26th Ave., S.E.
Washington, D. C. 20031

Aviation/Space Writers Association
c/o Ralph H. McClarren
100 Old York Rd.
Jenkintown, Pa. 19046

Civil Air Patrol Headquarters
Attention: Deputy Chief of Staff
Aerospace Education and Training
Maxwell Air Force Base, Alabama 36112

Flying Physicians Association
332 S. Michigan Ave.
Chicago, Illinois 60604

Lawyer-Pilots Bar Association
518 Market Street
Camden, New Jersey 08102

National Aerospace Education Council
Room 616, 806-15th St., N.W.
Washington, D. C. 20005

National Real Estate Fliers Association
716 Market Street
Knoxville, Tennessee 37902

Your State Aeronautics Commission

Your local School Superintendent

Your State Superintendent of Schools

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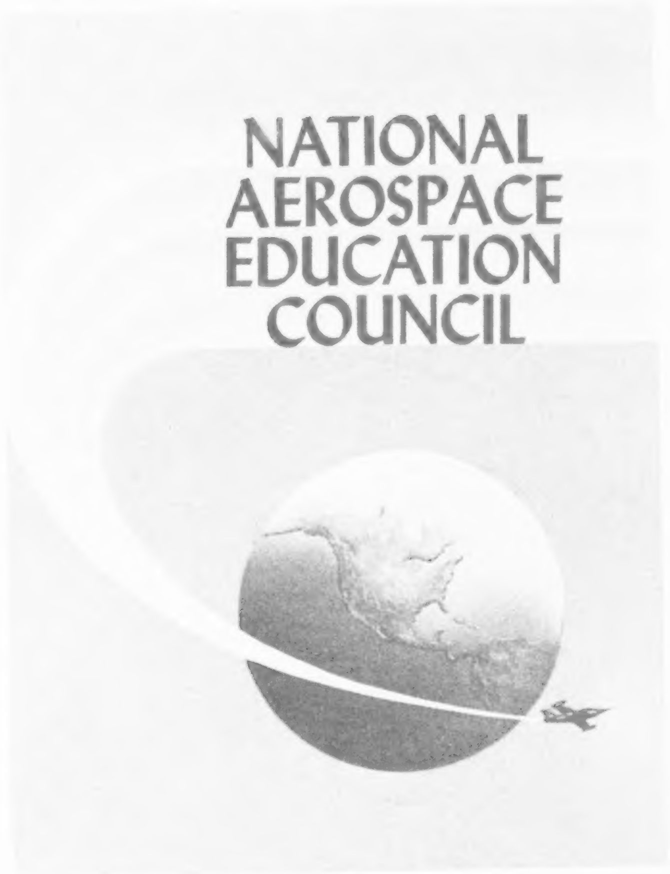
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